CURRENT HOUSING RESEARCH

Social, Economic and Technical Research

Volume 15
Number 1
Summer 2008

Canada

CMHC SCHL
HOME TO CANADIANS

CMHC—HOME TO CANADIANS

Canada Mortgage and Housing Corporation (CMHC) has been Canada's national housing agency for over 60 years.

Together with other housing stakeholders, we help ensure that Canada maintains one of the best housing systems in the world. We are committed to helping Canadians access a wide choice of quality, affordable homes, while making vibrant, healthy communities and cities a reality across the country.

For more information, visit our website at www.cmhc.ca

You can also reach us by phone at 1 800 668-2642 or by fax at 1 800 245-9274.
Outside Canada call (613) 748-2003 or fax to (613) 748-2016.

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CURRENT
HOUSING
RESEARCH

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Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***

INTRODUCTION

Under Part IX of the National Housing Act, the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced two times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's web site at http://www.cmhc-schl.gc.ca/en/corp/li/horetore/horetore_004.cfm

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "Completed Report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

ACQUIRING THE PUBLICATIONS AND REPORTS CITED AS COMPLETED

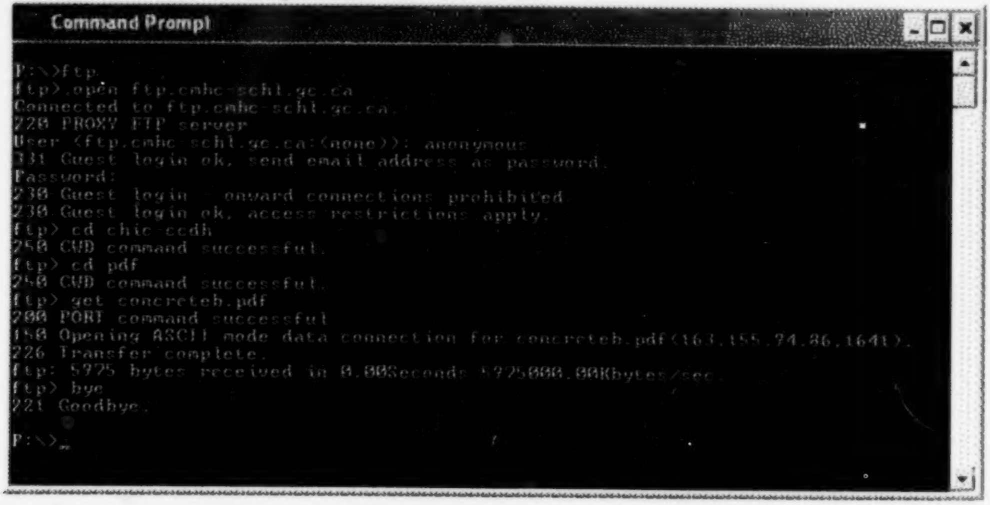
The availability section of each completed entry indicates the contact to obtain the item and whether the item can also be found on the Internet. Most items are available from the Canadian Housing Information Centre and can be ordered by using the information on the order form on the next page. We accept orders by regular mail, fax, phone, and via the Internet.

A number of the items cited are available electronically and the URL is included in the listing. CMHC uses an FTP (File Transfer Protocol) server to distribute reports. FTP has been used on the Internet as a means of transferring files between servers and users for many years and it continues to enjoy very wide use today.

In order to access a file using FTP, software with FTP capabilities is required and there are 3 types of FTP software:

1. Command Line FTP - FTP commands can be entered from a Command line or "DOS Prompt" on all Windows PCs.
2. FTP Client - a purpose built application to connect to FTP servers. These are widely available as commercial products or as shareware or even freeware on the Internet.
3. Some (not all) web browsers - Internet Explorer and Netscape can be used to access FTP files. They use correct protocol when ftp:// is entered in the address bar of the browser. Example: **ftp:**//ftp.cmhc-schl.gc.ca/

Here is an example of using the command line to retrieve a file from FTP.
FTP commands and help are available on PCs



```
P:\>ftp
ftp> open ftp.cmhc-schl.gc.ca
Connected to ftp.cmhc-schl.gc.ca.
220 PROXY FTP server
User (ftp.cmhc-schl.gc.ca:(none)): anonymous
331 Guest login ok, send email address as password.
Password:
230-Guest login - onward connections prohibited.
230 Guest login ok, access restrictions apply.
ftp> cd chic-ccdh
250 CWD command successful.
ftp> cd pdf
250 CWD command successful.
ftp> get concreteb.pdf
200 PORT command successful
150 Opening ASCII mode data connection for concreteb.pdf(163.155.94.86,1641).
226 Transfer complete.
ftp: 5975 bytes received in 0.00Seconds 5975000.00Kbytes/sec.
ftp> bye
221 Goodbye.

P:\>_
```

CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or research highlights listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa ON K1A 0P7
Fax (613) 748-4069
Telephone 1-800-668-2642
Email: chic@cmhc-schl.gc.ca

COMPLETED REPORTS REQUESTED

☐ Send copies of above reports, research highlights

☐ Add my name to your mailing list to receive *Current Housing Research*

Name		
Mailing Address (please include e-mail)		
City	Province	PostalCode

CMHC S EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and non-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made annually to support research investigations into important questions, problems, and issues affecting Canadian housing. CMHC is interested in receiving applications on topics related to existing CMHC housing research.

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or under-graduate level are not eligible to apply. Students may be hired to assist in conducting the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must apply as a private consultant, and the proposed research must not be part of, or interfere with his/her regular work. CMHC employees are not eligible to receive grants under this Program.

To obtain the Guidelines and Application Form (product #62964):

- visit our Web site at http://www.cmhc-schl.gc.ca;
- e-mail: erp@cmhc-schl.gc.ca; or
- call 1 800 668-2642.

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TECHNICAL RESEARCH

BASEMENT WALL INSULATION RETROFIT MONITORING

There have been field observations and research findings in the last several years which suggest that polyethylene as a vapour barrier in many wall assemblies may be overkill, and that other vapour retarder systems may be preferable. The last CMHC research showed that the below-grade portion of interior insulated basement wall assemblies might benefit from more permeability, not less. Various interior insulated assemblies have been suggested as alternatives. This project will measure the moisture performance of different basement interior insulation wall assemblies in 10 real houses to see if the research findings can be substantiated in the field, and to look out for unexpected repercussions in changing the current wall construction practice.

CMHC Project Officer : *Don Fugler* CIDN : 36970200
Division : Policy and Research *Division* STATUS : Ongoing
AVAILABILITY : Product is not yet available

FROST PROTECTED FOUNDATION MONITORING PERFORMANCE FOR RESIDENTIAL USES IN NORTHERN QUÉBEC, CHISASIBI PILOT PROJECT

This external research project will monitor the performance of a frost protected shallow foundation in a harsh northern Quebec climate setting. The project will provide in-situ measured data on the performance of this type of residential foundation. Results will be analysed to evaluate potential improvements to insulation levels and placement and will provide guidance for builders and designers. This project should be completed by July 2008.

CMHC Project Officer : *Ken Ruest* ***CIDN*** : 28920210
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

GUIDE TO FIXING YOUR DAMP BASEMENT

Appropriate for homeowners and home inspectors alike, this publication helps diagnose a prevalent problem in housing: damp basements. Damp basements can lead to the development of indoor mold, provoking allergies and other health problems. "A Guide to Fixing Your Damp Basement" provides a quick method for diagnosing moisture problems, and identifying and deciding on the solutions to deal with these problems. The "Guide" assists in diagnosing the problems, provides options for solving these problems, and helps decide on the plan of action required.

Revised edition. Ottawa: Canada Mortgage and Housing Corporation, 2008. v, 71 pages

Order number 65886 **Price: $9.95 + taxes + shipping charges

Nota : Disponible aussi en français sous le titre : Guide de correction des problèmes d'humidité dans les sous-sols

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products

BASEMENTS, FOUNDATIONS & CRAWLSPACES

RETROFITTING CRAWL SPACES - FIRST NATIONS DEMONSTRATION

The project will involve the retrofitting of several wet crawl spaces. The retrofits will be well-documented (e.g. video) and monitored for a period afterwards to verify effectiveness. The case studies will be used to demonstrate how to fix poorly performing crawl spaces. One demonstration may show inexpensive ways to lift existing houses and retrofit a better crawl space or basement underneath. Other possibilities include crawl space floor regrading, the use of exhaust fans to isolate problem crawl spaces, external utility buildings instead of basements, etc. The project has been prepared in conjunction with First Nations housing authorities and responds to a pressing problem found on many reserves. Completion is expected in 2009.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 33050200

STATUS : Ongoing

BUILDING CODES

COMPLYING WITH RESIDENTIAL VENTILATION REQUIREMENTS IN THE 2005 NATIONAL BUILDING CODE

The objective of this project was to update the existing CMHC publication, "Complying with Residential Ventilation Requirements in the 1995 National Building Code (NBC)" to reflect the ventilation requirement changes which are included in the 2005 NBC. This publication will provide builders and renovators with an illustrated explanation to describe and clarify what ventilation options can be used to comply with the 2005 National Building Code. A consultant revised the text to incorporate results from recent research and improved house construction techniques. A group of home builders reviewed the text and illustrations were redrawn. The document is complete, but conflicting code requirements discovered during the research must be reconciled prior to publication. CMHC has attempted to resolve some of these conflicts with code officials before issuing the publication, but has made no significant progress. CMHC is now waiting on rulings by NBC officials so that appropriate changes can be made prior to publishing.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 35620200

STATUS : Ongoing

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. A new draft of the document is available, but some technical and terminology questions have yet to be resolved. The CGSB will be re-balloting the draft of this standard when it is ready.

CMHC Project Officer : Don Fugler

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 19710200

STATUS : Ongoing

CHARACTERISTICS OF EFFECTIVE WATERPROOF SEALERS FOR MASONRY

The objective of this project is to study the vapour permeability characteristics of effective sealers applied to masonry walls. The issue being explored is not one of stopping water absorption/penetration into the masonry, since most sealer products are effective in this role. Rather, the project attempts to assess the extent to which sealers permit drying of the masonry once the masonry is wetted. In addition, the project will explore the risk posed to sealed masonry to freeze-thaw damage if the sealers entrap moisture within the masonry units. CMHC, in partnership with Masonry Canada, is providing funds to the University of Waterloo to undertake this preliminary study. This phase of the project will investigate the performance of 5 sealer types on individual masonry units and small masonry panels. The testing of the vapour permeability of the masonry test panels is still ongoing. The project is expected to be completed by summer 2008.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 25610200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CHARACTERIZATION OF THREE TYPES OF CLAY TO FACILITATE THE DEVELOPMENT OF CLAY-BASED ENVIRONMENTALLY FRIENDLY PRODUCTS

Clay based plaster is rare, misunderstood and poorly documented. This product has real potential, however, for sustainable development in the housing sector. This External Research Program project is a study of three types of clay in order to establish the scientific bases of knowledge on the manufacture of raw clay materials. Such plaster is usually composed, in descending order, of the following materials: sand, clay, vegetable fibre and hydrated lime putty.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 28920207
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

COMPRESSED EARTHBLOCK (CEB) - STRAWBALE HYBRID BUILDING SYSTEM

This project will investigate the performance of straw bale insulation in combination with compressed earth blocks, as a hybrid building system. The researcher will be monitoring energy use as well as some of the performance characteristics of the earth blocks. The project has been initiated but construction has not yet started.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 36260216
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EFFECT OF MESH AND BALE ORIENTATION ON THE STRENGTH OF STRAW BALE WALLS

The objective of this research was to obtain data on the structural performance of straw bale construction to aid prospective home-owners, builders, building inspectors, and engineers. Structural testing of full-scale straw bale walls was carried out in the Structures Lab of the Department of Civil Engineering at Queen's University, Kingston. Test walls were constructed and subjected to compressive loading until failure. The stiffness and strength of each wall was measured, allowing a comparison to be made between various combinations of reinforcement, bale orientation, and plasters. In order to make this research as relevant as possible to the stakeholders, Chris Magwood, a builder and consultant on dozens of straw bale projects in Ontario, was actively involved in defining the most relevant parameter combinations and constructing the wall panels. The Ontario Straw Bale Building Coalition (OSBBC) and other Canadian sources have been consulted.

Prepared by P.I. Colin MacDougall, Department of Civil Engineering, Queen's University. Co-investigators: Chris Magwood, Steve Vardy. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2008. (External Research Program Research Report) 61 pages (4032 KB)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/EFFECT_of_Mesh(W).pdf

GYPSUM WALLBOARD CORE STRUCTURE AND EFFECTS ON END USE PERFORMANCE

Gypsum wallboards are used as an interior finishing surface in many Canadian houses. The core structure of gypsum wallboard contributes to the board's end use, fire resistant properties and fastening strength. Commercial boards have core structures which may differ greatly. This research study, funded under CMHC's External Research Program and undertaken by Innogyps Inc., produced laboratory gypsum board samples made from various industry representative chemical foaming agents, produced at various foam densities in order to generate an array of different gypsum core structures to be evaluated. These samples were investigated for 2 major performance parameters; (a) fire resistance (as measured by shrinkage resistance and surface cracking when exposed to high temperatures) and (b) fastening performance (as measured by nail pull testing). In general, it was determined that various core structures at relatively consistent board weights were able to be produced using a lab-scale continuous foam generation system. Average void sizes ranged from 275-750um (as determined by CT scanning). There was no observable affect of core structure on volumetric shrinkage or surface cracking resistance when samples were subjected to 1000 C firing temperatures. Nail pull measurements showed a degree of scatter of results that did not absolutely correlate core structure to nail pull performance but did highlight some potentially strong performing samples.

Prepared by Innogyps Inc. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2007 (External Research Program Research Report) 1 CD-ROM

STATUS : New Completed CD-ROM

AVAILABILITY : Canadian Housing Information Centre

BUILDING MATERIALS

TEMPERATURE AND MOISTURE CONDITION OF WOOD STRUCTURAL MEMBERS EMBEDDED IN INTERIOR INSULATED SOLID MASONRY WALLS, MONITORING OF THE GROSH BUILDING, STRATFORD, ONTARIO

Two projects were launched to monitor the temperature and moisture content of wood structural members (joists) embedded in interior insulated solid masonry walls. Houses with solid masonry walls in Kincardine, Ontario, and Wolsely, Saskatchewan that were retrofitted with interior insulation were fitted with the necessary instrumentation to monitor the moisture and temperature regimes in wood joists embedded in the masonry walls. Based on the limited monitoring conducted in the two houses, the long-term durability of the wooden members does not appear to be adversely affected by the installation of the interior insulation systems. However, there was one exception. In the Kincardine House, joist ends embedded in the stone foundation wall experienced ever increasing moisture content after the installation of the interior insulation (spray applied poly urethane foam). It was suspected that moisture wicking up the foundation wall became trapped and this raised the moisture content of the monitored wood joist end. When the insulation was removed from around the joist, the joist began to dry. This finding supports the general observation that interior insulation retrofits of solid masonry structures should only be considered if moisture issues are first addressed. The reports for the projects will be made available by summer of 2008.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 24290200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

UPDATING CMHC'S "BUILDING MATERIALS FOR THE ENVIRONMENTALLY HYPERSENSITIVE"

This project will revise and upgrade CMHC's publication "Building Materials for the Environmentally Hypersensitive". The revision will add new information about products listed in the book together with new products that were not commonly used for residential construction in 1993 when the book was first published. Products that are no longer manufactured will be deleted. Results from emissions testing of materials, when available, will be added. The document will be reviewed and updated in 2007 and will be published in 2008.

CMHC Project Officer : *Virginia R Salares* — ***CIDN*** : 36360200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CONSUMER INFORMATION

CREATION OF CONTENT FOR "ABOUT YOUR APARTMENT" FACT SHEETS

This project builds on the success of CMHC's About Your House series by providing consumer level information for the residents of multi-unit residential buildings. Key topics ranging from resolving indoor air quality, water penetration, occupant comfort, saving energy and water, through to security and safety are being covered. Much of the material is being developed from existing CMHC research and publications. The information will be organized into fact sheets that consumers and property owner-managers can use to solve problems in their buildings. The first 10 publications will be completed by September 2008.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 31660200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDE - WINDOWS

In partnership with Natural Resources Canada and the Homeowner Protection Office, CMHC developed this comprehensive and practical technical advisory document for architects, engineers, builders, renovators, window manufacturers, window installers and others involved in the design, specification, construction, installation and interfacing of windows within the exterior wall assembly in both low-rise and high-rise residential construction. This document provides guidance in selecting the appropriate window performance criteria for the intended application and provides installation details to ensure the performance criteria is achieved through the effective continuity of thermal, air, vapour and moisture barriers at the interface between the window units and the wall assembly. The project has been completed and the document is being translated and formatted for publication. The Best Practice Guide will be available by summer of 2008.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30870200
STATUS : Ongoing

EVALUATING THE EFFECTIVENESS OF WALL-WINDOW INTERFACE DETAILS TO MANAGE RAINWATER

Based on the need for effective window-wall interface details to manage water intrusion, CMHC is developing a Best Practices Guide for Window Installation that will be applicable to both low-rise wood frame construction and high-rise buildings. To support the development of the Guide, and the needs of the fenestration, wall cladding and flashing industry, CMHC in partnership with the National Research Council (NRC), formed a consortium of interested North American organizations to evaluate specific window-wall interface details to determine how effective the details are in managing rainwater. CMHC and NRC funded the first phase of this multi-year study. The Phase I testing program, highlighting wall-window interface details of interest to CMHC, was completed in fall of 2006; the final Phase I report is expected to be released by spring of 2008. The Phase 2 testing program, funded by industry partners, was completed in the winter of 2007. The final Phase 2 report is expected to be completed by December 2008. Phase 3 of this study, funded by Public Works Government Services Canada, will commence in the spring of 2008 with expected completion by spring 2009.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 27080200
STATUS : Ongoing

THERMAL PERFORMANCE OF WINDOW ASSEMBLIES

CMHC in collaboration with the National Research Council, together with industry participation, is undertaking a study to investigate the thermal performance of window installations. Current and best practice window installations will be tested and evaluated for typical wood-frame residential building construction; consideration will be given to investigating different window frame materials and profiles, a variety of interior-exterior temperature conditions, the position of the window within the rough opening and the contribution of insulation between the window and the rough opening to overall thermal performance of the installed assembly. The test data will then be used to validate computer models. Parametric analysis will be undertaken to examine the performance of the window-wall interfaces for different climates across Canada. The project will commence by the summer of 2008. The testing program will be completed by December 2008 and the project completed by the summer of 2009.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 33180200
STATUS : Ongoing

WINDOW INSTALLATION COURSE - DEVELOPMENT AND DELIVERY

The objective of this project will be to develop a 'Window Installation' course. The course will be directed at those trades, or trades-persons, responsible for the installation of windows. The course will cover window installation in both low-rise and high-rise construction assemblies. The course will introduce to the installer the fundamentals in building science concepts required to integrate window and envelope performance criteria including airtightness, water-management and thermal performance (condensation resistance). It is expected that the course material will be incorporated in the technical programs offered by technical colleges and continuing education programs for trades-persons.

The Canadian Standards Association (CSA) is proposing to create a National Certified Personnel Program for Window Installers. The 'Program' steering committee (currently comprising of CSA, Canada Mortgage and Housing Corporation (CMHC), Canadian Window and Door Manufacturers Association (CWDMA) and Natural Resources Canada (NRCAN), will oversee the development of this Window Installation Course. This course will provide technical content that will be necessary in attaining certification status. The establishment of a CSA Certification Program and the development of a Window Installation course is expected to occur concurrently, commencing in the fall of 2007. The course development is expected to be completed by spring 2008.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 30700200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ****NEW****

ENERGY CONSERVATION

AIR LEAKAGE CONTROL DEMONSTRATION PROJECT IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will assess the individual and collective impact of air sealing measures on building envelope air leakage characteristics, building energy consumption, indoor air quality and occupant comfort in multi-unit residential buildings. Air sealing products and measures will be documented for common air leakage points. The predictive capabilities of existing air leakage models will be assessed by comparing their estimates of annual energy savings with that actually achieved in practice. Currently one air leakage control project is underway. Two other projects have since been discontinued at the request of the property management due to other repair/maintenance and capital replacement priorities. The remaining project is in Saskatoon, Saskatchewan and the air leakage control work has been completed. The assessment of the costs is underway and the impact of the air leakage control measures on energy consumption will be estimated based on energy metering over the next year. This project will be completed by 2008.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 30410200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

AIR LEAKAGE CONTROL MANUAL FOR EXISTING MULTI-UNIT RESIDENTIAL BUILDINGS

This manual provides guidance to air leakage control (ALC) contractors on how to reduce air leakage in existing high-rise multi-unit residential buildings (MURBs). The objective of the manual is to assist ALC contractors to understand where, how and why MURBs leak so that they can prepare ALC plans that will reduce air leakage.

This Manual provides information on air barrier systems in building envelopes, instructions on how to diagnose air leakage and seal leaks based on currently available materials and technologies. It provides guidance on air sealing measures to reduce air leakage, reduce building energy consumption, improve indoor air quality and occupant comfort in multi-unit residential buildings. Air sealing products and measures are detailed for common air leakage points.

Research Report Housing Technology Series. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2007. 66 pages (3.13 MB) (Order number 65847)

Nota : Disponible aussi en français sous le titre : Guide de réduction des fuites d'air dans les tours d'habitation existantes

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and http://www.cmhc.ca/od/?pid=65847

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

The potential for energy and greenhouse gas emission reductions in multi-unit residential buildings due to the implementation of energy efficiency measures is being assessed using the building files of the CMHC HiSTAR database. Two projects are currently underway to assess the extent to which multi-unit residential buildings must be retrofitted in order to meet 10%, 20% and 40% reductions in energy use. The studies are limited to the HiSTAR database due to the lack of available information on the total number of multi-unit residential buildings in Canada. In a related, interdepartmental project, an energy and green house gas emission simulator (BESET) has been developed by Natural Resources Canada to analyze the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions can be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The two CMHC reports that are studying the retrofit potential of multi-unit residential buildings have been completed and are under review. The reports will be available by July 2008.

CMHC Project Officer : *Duncan Hill*

CIDN : 22490200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

APPROACHING NET ZERO ENERGY IN EXISTING HOUSING

This research project explored the technical feasibility of reducing the energy consumption of existing houses to net zero on an annual basis. The project characterized the energy consumption patterns in existing housing and compiled energy efficiency and energy generation measures. Through this work, the potential for energy reduction, energy storage and renewable energy generation was assessed. The project also considered the trade-offs in comfort, cost, and convenience necessary to attain very low energy consumption in existing housing. This is conceptual research as the possibility of creating a net-zero-energy house from an existing dwelling is extremely challenging.

The research showed that some houses (e.g . bungalows) and some locations (e.g. Vancouver) had a far better chance of achieving net zero energy usage due to their inherent advantages. Most of the modelled houses were able to attain very low heating energy requirements. The compensating energy production, through solar thermal and photovoltaics, is often limited in effectiveness by roof size and orientation, as well as by high capital costs. The report provides a good background on what is possible for older houses and at what cost. It also provides interesting information on potential wall assemblies for these houses and decision trees on which energy retrofits to select for specific houses.

Prepared by Shawna Henderson, Abri Sustainable Design & Consulting and Chris Mattock, Habitat Design + Consulting. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2007. 198 pages (4065 KB)

Note: No. 08-104 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 66060)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/S60376(W).pdf

CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, conducted a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The project identified what data is available on energy and water end uses, research projects, data, monitoring protocols and published information relating to energy and water load profiles of housing. The study concluded that consistent, accurate and detailed load profiling data is not available for all end-uses in dwellings, particularly multi-unit residential buildings. The results of the load profiling literature search will be made available in a CMHC research highlight by December 2008.

CMHC Project Officer : *Duncan Hill*
CIDN : 22010200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CMHC ENERGY EFFICIENCY CASE STUDIES MOLE HILL COMMUNITY GROUND SOURCE HEAT PUMP CONVERSION PROJECT

A project has been initiated to document, as an energy efficiency case study, the conversion of the dwellings of the Mole Hill Community to ground source heat pump systems. The project will describe the situation that led to the decision for the conversion, the design, installation and commissioning, and the post installation performance of the systems. The annual energy use of the project, after the conversion and any resultant cost savings will also be identified. The project will be completed by the fall of 2008.

CMHC Project Officer : *Duncan Hill*
CIDN : 18990200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DESIGN SURVEY OF LOW ENVIRONMENTAL IMPACT HOUSING

This research project will provide a documentation of the best existing examples of low environmental impact housing forms (including net zero energy) to date in Canada and internationally in similar climates. The goal is to eventually establish criteria and specifications for zero environmental impact housing in Canada, develop best practice models towards achieving this goal, and ultimately demonstrate these "deep green" housing models for Canadian climatic regions. Case studies of this series will be published on the CMHC web site.

CMHC Project Officer : *Duncan Hill*
CIDN : 25400200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF AN ENERGY MANAGEMENT PILOT PROGRAM FOR SOCIAL HOUSING IN ONTARIO

CMHC is participating in the development of an Energy Management Program and pilot project for social housing. CMHC will be working with the Social Housing Services Corporation of Ontario to develop an Energy Management Program that will provide local social housing providers with the tools needed to evaluate and implement energy and water efficiency measures in their buildings. CMHC support will be used to develop or adopt tools for the Energy Management Program including utility tracking and on-line energy/water audit facilities, standard energy audits, and communication documents for property owners, managers and residents. CMHC will also participate in the evaluation of energy and water efficiency projects in 20 buildings selected to participate in a pilot project to evaluate the costs and benefits of the Energy Management Program. CMHC support will be useful to establish the Program in Ontario and will also provide other provinces with useful information on the development of central energy programs for their social housing stock as well. The project report will be available in 2008.

CMHC Project Officer : *Duncan Hill*
CIDN : 29820200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DOCUMENTATION OF AN ENERGY MANAGEMENT PLAN FOR SOCIAL HOUSING

CMHC is preparing a report to describe an Energy Management Plan developed for Social Housing Providers. The report will document the organizational structure, processes, tools, documents, financing strategies, reporting, and quality assurance of the program. The final report will be delivered to all provincial and territorial housing agencies so that they may become informed of the Ontario program and to provide them with the opportunity to engage the plan, or any of its individual components, within their own jurisdictions.

CMHC Project Officer : *Duncan Hill*
CIDN : 36070200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFECT OF SUNLIGHT CONTROL IN APARTMENT BUILDINGS

This External Research Program project will evaluate the impact of various sunlight control strategies on comfort conditions and energy use in multi-unit residential buildings. Sunlight control is important to prevent overheating which can lead to higher air conditioning costs and occupant comfort problems. Sunlight control is also required to allow for full use of solar gains to offset space heating and lighting loads. The control strategies will be assessed using computer models that can predict indoor conditions and energy loading with different architectural features such as awnings, sun shelves, lintel arrangements and other shading strategies. The final report will generate design guidelines for the control and optimization of sunlight for multi-unit residential buildings.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 28920204
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFICIENCY AND RETROFIT IMPLICATIONS OF BUILDING RECOMISSIONING SURVEY

CMHC, in cooperation with Natural Resources Canada, conducted a literature survey of the availability of recommissioning guidelines and other "tune-up" procedures for multi-unit residential buildings. The survey found that there was no single source of published information for enhancing the performance of multi-unit residential buildings via low and no-cost measures. Information was found to be available for individual measures to improve space heating, domestic hot water, lighting and appliances, building envelope and ventilation systems. Given the absence of recommissioning or tune-up guidelines for multi-unit residential buildings but the availability of information for discrete building systems from a wide variety of sources, the project concluded that CMHC should initiate a subsequent project to compile the measures into a single Tune-Up Guide for Multi-Unit Residential buildings. The project is complete. A Research Highlight detailing the findings of the literature search will be published in 2008.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 23590200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in both new and existing multi-unit residential buildings to be used as case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC has developed. The case studies completed include: 1. Conservation Co-op, Ottawa; 2. Energy Efficiency Retrofit of the Broadview Apartment Building, Toronto; 3. Almon Street CBIP Building; and 4. Apartment Building Retrofit, Bay Street, Toronto. Ongoing projects include: 1. Performance of an Apartment Building equipped with a Water Loop Heat Pump System; 2. Grandin Green CBIP Building; and 3. Energy and Thermal Performance of an ICF Apartment Building. The case studies will be published as a part of the CMHC Better Building Series starting July 2005 and will be issued periodically as they are completed.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 18990200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

MONITORING OF THE ACTIVE SOLAR SPACE AND WATER HEATING SYSTEM AND INDOOR AIR QUALITY AT THE FACTOR 9 HOME

This project will support a multi-stakeholder initiative to design, build, monitor, and showcase a Factor 9 detached house in Regina, SK in 2005. The Factor 9 house will use 90% less energy and 50% less water than current Regina housing; and address other environmental issues such as: landscaping, indoor air quality, construction waste management, and durable building materials. This project will provide the monitoring component and will commence upon occupancy, after the 30 day show home period following the completion of construction. An automated datalogging system will be used to take continuous readings of natural gas, electricity, and water consumption rates, as well as appliance consumption rates, indoor temperatures and indoor air quality parameters. The project will demonstrate that significant water and energy efficiencies can be met in housing using existing technologies without added costs. The project will lead to an increased consumer awareness and market penetration of efficient housing in Canada.

CMHC Project Officer : *Anand Mishra* **CIDN** : 35480200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

REGULATORY AND ORGANIZATIONAL REQUIREMENTS FOR PRIVATE DISTRICT ENERGY SYSTEMS

A research project is underway to assess the regulatory and organizational requirements of non-public utilities that provide service to multi-unit residential buildings. The project will identify issues regarding utility ownership and operation that must be addressed, governing regulations, and potential ownership-client arrangements. The project will provide guidance to private firms, housing providers, developers and condominium corporations that may be considering the generation of heat and power for sale to individual apartments or entire buildings within a community. This project is a part of a larger program of work being conducted in cooperation with Natural Resources Canada to assess the opportunities for ground source heat pumps in district energy systems. Ownership and regulatory issues represent a challenge to those other than established public utilities who would like to provide energy services, from ground sources, renewables as well as conventional technologies, to individual or clusters of multi-unit residential buildings. The project will be completed by December 2008.

CMHC Project Officer : *Duncan Hill* **CIDN** : 32960200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

SUPPORT FOR IEA ANNEX 39: HIGH PERFORMANCE THERMAL INSULATION SYSTEMS

The International Energy Agency (IEA) has launched an R&D program to research high performance thermal insulation systems for buildings. The project will focus on vacuum insulation panels that can achieve, in theory, an insulating value of R75 per inch. Vacuum panels represent an order of magnitude improvement over conventional insulating materials, thus the energy saving potential for both new and existing buildings is enormous. Plans are being developed to organize and run a demonstration project using vacuum panels in order to assess their application and performance in buildings. CMHC will be supporting Canada's contribution to the IEA project, led by NRC's Institute for Research in Construction, and will be able to disseminate the results to the housing industry. Canada has also been asked to participate in the development of an international standard for vacuum insulating panels as a part of the IEA effort. The project is currently underway and will be completed by September 2008.

CMHC Project Officer : *Duncan Hill* **CIDN** : 30450200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF COMPRESSED AIR FOAM SPRINKLERS

Automatic fire sprinklers that use large quantities of water to suppress fires are often unsuitable in remote and northern communities, when the water supply is scarce. The project will modify existing compressed air foam (CAF) sprinkler technology developed by NRC for institutional and commercial use, for single- and multi-family housing. Under the direction of Dr. Andrew Kim at NRC, the project will demonstrate compressed air/foam sprinklers which require a fraction of the amount of water used by conventional sprinklers, in a residential application suitable for use in northern and remote communities. A prototype will be tested in a controlled fire in a vacant house. The project should be complete by the spring of 2008.

CMHC Project Officer : *Barry Craig*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24680201
STATUS : Ongoing

FIRE PREVENTION IN ABORIGINAL COMMUNITIES - DVD = PRÉVENTION DES INCENDIES DANS LES COLLECTIVITÉS AUTOCHTONES - DVD

Based on CMHC research on the fire prevention in aboriginal communities, this 20 minute DVD addresses the common causes of house fires in Aboriginal communities and suggests how to prevent them. It is intended for use by volunteer firefighters and housing managers to show to members of Aboriginal communities as part of their fire prevention program.

Ottawa: Canada Mortgage and Housing Corporation, 2007. (Order number 65651)

STATUS : New Completed CD-ROM
AVAILABILITY : CMHC Information Products

FIRE PREVENTION IN ABORIGINAL COMMUNITIES - MANUAL

CMHC developed this Fire Prevention Manual to help volunteer firefighters and housing managers in the effort to establish and improve fire prevention practices in their Aboriginal communities. The research undertaken was prompted by the results of CMHC's 2004 Canadian Housing Fire Statistics Report which presented alarming findings on the incidence of fire and its effects on First Nations communities in Canada. The Manual was developed by speaking with volunteer firefighters in ten different Aboriginal communities. The results of these discussions were then organized into case studies, each describing the prevention efforts of a particular community. Among the many topics discussed in the case studies are candle safety, chimney maintenance, arson prevention, and the beginning and growth of a volunteer firefighting squad. In addition to the ten case studies, the appendices of this Manual contain checklists and tools that volunteer firefighters and housing managers may find useful in planning fire prevention programs and finding more information about fire prevention in general.

Prepared by InterINDigital Entertainment Inc. with the assistance of gordongroup. Ottawa: Canada Mortgage and Housing Corporation, 2007. iii, 46 pages (2..02 MB) (Order number 65310)

Nota: Disponible aussi en français sous le titre : Manuel sur la prévention des incendies dans les collectivités autochtones

Note: No. 07-009 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65550)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : CMHC Information Products and
http://www.cmhc.ca/od/?pid=65310

FIRES & FIRE PREVENTION

SPECIAL INTEREST GROUP ON FIRE PERFORMANCE OF HOUSES

In recent years, Canadian fire death statistics have followed a downward trend. As technological advances introduce new construction practices, building designs and materials into new house construction, the fire protection community needs evidence that safety isn't compromised. The Canadian Commission on Building and Fire Codes (CCBFC) and the Canadian Commission on Construction Materials Evaluation (CCCME) requested information regarding the potential impact of such changes on the fire safety of low-rise housing. In response, NRC's Institute for Research in Construction (IRC), in partnership with CMHC, government, industry, and codes and standards agencies, has undertaken a project to research fires in single-family dwellings and the factors affecting fire safety. The primary objective of this research is to determine the impact of innovative residential construction products and systems on fire safety. The project should be complete in 2007 and a final report available in 2008.

CMHC Project Officer : *Barry Craig*
CIDN : 33100200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

TESTING FIRE AND SMOKE MOVEMENT IN ACCESSORY APARTMENTS

The study tests the movement of fire and smoke in a single family residence containing an accessory apartment. A test protocol has been designed to measure the ability to control smoke and fire by use of fire separations, closures (including doors), ventilation systems, plumbing and firestops. The study also measures the time for smoke detectors to respond to a fire situation, for environments to become untenable and for occupants to safely evacuate. Results of this research will: 1. determine the significance of the fire performance of conventional fire separations in Canadian houses to the safety of occupants in houses containing an accessory apartment; 2. measure the fire performance of traditional house construction, as a benchmark for evaluating the fire performance of innovative construction products and systems; and 3. measure the products of combustion produced by a standard fire in various locations in a simulated building containing an accessory apartment as a benchmark for evaluating evacuation times. This research will be useful to authorities to produce legislation for safer housing, and in establishing performance criteria for accessory apartments. Occupants will be safer and better-informed of the dangers of household fires. The draft research report should be complete in late 2007 and the final report in 2008.

CMHC Project Officer : *Barry Craig*
CIDN : 35690200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HEATING AND VENTILATION

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project was to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute for Research in Construction, monitored indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance was also assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, are used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings. A report and research highlight documenting the results of the project will be available by the fall of 2008.

CMHC Project Officer : *Duncan Hill* **CIDN** : 19340200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING

Two-pipe water loop heat pump systems represent an innovative approach to heating and cooling multi-unit residential buildings. The system consists of a central water distribution system that distributes moderately warm water to each apartment in the winter and cool water in the summer. An in-suite heat pump fan coil unit is then used to heat or cool the apartment depending on the season using the central water loop as a heat source or a heat dump. In theory, the system will allow for simultaneous heating and cooling of different areas of the building by redistributing heat to where it is needed. This ability is thought to offer significant energy savings but the extent to which this may be the case has not been evaluated. CMHC is undertaking a project to characterize the performance of a water loop heat pump system in a multi-unit residential building in Ottawa so that the potential for energy savings can be assessed. The project will evaluate energy consumption, and operational and maintenance issues over a one-year period. The project will be completed in December 2008.

CMHC Project Officer : *Duncan Hill* **CIDN** : 18990200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EXPLORING VENTILATION SYSTEMS FOR MURBS IN MARITIME CLIMATES

CMHC, in cooperation with the Homeowner's Protection Office of British Columbia, will conduct a research project to study two key ventilation issues affecting multi-unit residential buildings in the moderate coastal regions of Canada. Specifically, the project will evaluate the extent to which moisture laden outdoor air can be used to control indoor moisture loads without mechanical air conditioning or dehumidification. The project will also assess the ability of simple semi passive ventilation systems to exchange, condition, distribute and circulate air within individual apartments. Semi-passive ventilation systems offer many advantages to conventional MURB ventilation but the extent to which they can meet ventilation needs under varying indoor outdoor conditions and occupant lifestyles must be explored. The projects will be undertaken concurrently and will be used to produce guidelines for ventilation systems in multi-unit residential buildings in mild coastal climates. The projects will be completed in 2008.

CMHC Project Officer : *Duncan Hill* **CIDN** : 33170200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HEATING AND VENTILATION

INVESTIGATE THE FEASIBILITY OF HUMIDISTAT CONTROLLED HEATING TO CONTROL MOISTURE AND PREVENT CONDENSATION INDUCED MOLD PROBLEMS IN HOUSES

This project will investigate the feasibility of humidistat controlled space heating strategy to regulate the temperature and humidity levels in dwellings to prevent condensation and mold growth while realizing energy savings. Existing literature and data on this strategy will be compiled from literature searches of available research, data and other source materials on humidistat controlled space heating, as well as interviews or site visits, where this technique has been used. The aim of the study is to determine if this approach is feasible for houses and apartments, and to provide information system design and configuration. This moisture and heating control strategy is applicable when occupants want to temporarily (short or long-term) maintain low interior temperatures to conserve energy while preventing humidity levels from increasing above the critical point at which condensation and mold growth could occur.

CMHC Project Officer : *Ken Ruest* — ***CIDN*** : 36980200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ****NEW****

TUNE-UP GUIDE FOR MULTI-UNIT RESIDENTIAL BUILDINGS

A guide has been developed that compiles existing information on how on-site staff and contractors can improve, or fine tune, the performance of multi-unit residential buildings. Similar guidelines exist for commercial buildings but are referred to as re-commissioning guidelines. The guide will provide low cost and no cost methods to improve the performance of building envelope, space and domestic hot water heating, ventilation, health and safety, and electrical systems and appliances in multi-unit residential buildings. While the energy savings accrued are expected to be modest, use of the guide will ensure that buildings operate efficiently and performance problems are resolved before they become larger concerns. The Tune-Up guidelines will also allow a property owner or manager to establish optimal system conditions so that the impact of repairs, renovations, or energy and water efficiency improvements can be realistically evaluated. The Guide will be available by December 2008. CMHC field testing of the Guidelines in Toronto and Saskatoon began in September 2003 but delays in implementation in both cities lengthened the post implementation periods to March 2006 for Saskatoon and possibly December 2006 for the Toronto projects.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 23590200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

BEST PRACTICE GUIDE ON FIRE STOPS AND FIRE BLOCKS AND THEIR IMPACT ON SOUND TRANSMISSION

This Best Practice Guide presents a broad-based consensus on technical solutions relating to the fire resistance and sound transmission aspects of fire stops and fire blocks for those who manufacture, design, specify, install and inspect these systems. The Guide was developed through collaboration of many organizations in the Special Interest Group on Suitable Acoustic and Fire Stop Technologies (SIG-SAFT). The Guide primarily addresses fire stops and fire blocks in the context of Canadian codes and standards. Requirements for fire stops and fire blocks in the National Building Code of Canada (NBCC) are conceptually similar to those in U.S. codes but significant differences between Canadian and American codes, standards, and terminology are identified. The Guide also identifies differences from the NBCC that have been approved in provincial building codes. The Best Practice Guide is not intended for use as a code document. While the Guide makes extensive reference to the NBCC as the source of requirements for fire stops and fire blocks in Canada, there are situations where best practice may require features beyond the NBCC requirements. These are addressed in many examples in Chapters 7 through 13, which illustrate good practice for fire stops at junctions and penetrations (plumbing, electrical, ventilation), combined with guidance on the corresponding acoustical issues such as noise leaks, plumbing noise, and structure-borne sound transmission. The authority having jurisdiction would decide on acceptance of such solutions, but it is hoped that the Guide will promote more informed and consistent practice across Canada for fire stops and fire blocks.

Prepared for Special Interest Group on Suitable Acoustic and Fire Stop Technologies. Prepared by J.K. Richardson, J.D. Quirt, R. Hlady. CMHC Project Officer: Barry Craig. Ottawa: Institute for Research in Construction, National Research Council of Canada, 2007. 1 volume + CD-ROM

STATUS : New Completed Report

AVAILABILITY : http://irc.nrc-cnrc.gc.ca/pubs/fulltext/nrcc49677/nrcc49677.pdf

BEST PRACTICE GUIDES UPDATE

This project will revise, one at a time, the five existing Best Practice Guides, starting with Brick Veneer Steel Stud published in 1996. New research and user feedback from seminars based on the guides and from CMHC's web site indicate that some text and details need updating. Partnerships will be developed with interested parties for input, review and promotion. A national competition will be held to select a consultant for each guide who will be responsible for coordinating and producing the revision work. Each consultant will work with an advisory committee, specific to each guide, who will participate in drafting the new edition. The advisory committee will include practitioners, industry representatives, manufacturers and regulators. The work will include a thorough study of the existing Guide, an analysis of users' feedback, and roundtable critique sessions. Public sessions will be held to discuss the proposed revisions. The consultant will then collect the information, produce the revised manuscript and obtain consensus from the advisory committee. The revised Brick Veneer Steel Stud guide is currently being reviewed by the advisory committee, and should be complete in 2008.

CMHC Project Officer : *Barry Craig*
CIDN : 23780200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

BETTER BUILDINGS - RETROFIT CASE STUDIES

This project documents and illustrates repairs and upgrades to multi-unit residential buildings across Canada. It is estimated that, in this country, $300 M is spent every year in premature building failures. CMHC is collecting and publishing easy to read case studies to present to owners, architects, builders and property managers on what can go wrong and why, how to fix it and how much it will cost. Most cases will focus on the building envelope since the vast majority of documented problems occur there, in addition to examples of energy and acoustical upgrades. This project adds to CMHC's current documentation and publication of case studies on repair and retrofit of multiple-unit residential buildings. Ultimately, a repair guide will be developed based on this work. Case studies from across Canada are obtained from those directly involved in the repairs and involve buildings of all types of construction ranging in height from 3 to 50 storeys. Every year the Corporation publishes 10 Better Buildings Case Studies on CMHC's website.http://cmhc.ca/en/imquaf/himu/bebufa_021.cfm. Since the project began, in 1999, 57 case studies have been published.

CMHC Project Officer : *Duncan Hill*
CIDN : 33960200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is available on the web

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project reviewed Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites based on the number of building permits issued since 1970. Using STATSCAN data, it was concluded that approximately 6,000 condominium buildings exist in Canada. Based on discussions with the Canadian Condominium Institute and other agencies, this estimate likely understates the number of buildings. The review also found that buildings could not be classified by the number of storeys nor number of units using STATSCAN data. Based on the outcome of this project, CMHC initiated another project with the University of Ottawa to review the data available on condominiums within municipal files. The project revealed that the data exists within the local land registry office but was difficult to extract given the state of the individual files. Nevertheless, the University of Ottawa was able to characterize the population of condominiums in the greater Ottawa area in terms of number of buildings, number of units, number of storeys and age. A report and Research Highlight documenting the project findings are available: "Characterizing the Condominium Population of the Greater Ottawa Area, 1969 - 2002". CMHC repeated the project in Halifax, Nova Scotia, to determine whether or not similar opportunities to characterize the stock of condominiums exist elsewhere. This project has been completed and the report will be available late in 2008.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 227702 00001-2
STATUS : Ongoing

DETAILS FOR SUSTAINABILITY IN PRECAST CONCRETE

Sustainability has become essential in building design. Architects need an impartial and accurate document to design sustainable cladding using precast elements. In 2001, CMHC published a Best Practice Guide for architectural precast panels. This work will complement the Guide by providing guidance on architectural sustainability solutions for the system. This document, alone and as part of the Best Practice Guides, will illustrate typical junctions with particular attention to air barrier and thermal continuity, water management and avoiding condensation by diffusion. A consultant will develop a sustainability rationale applied to precast buildings. Construction details showing alternative, greener, materials and practices will be drawn to give architects and owners choices and as the basis for informed solutions. Cost will be a component of the selection criteria in order to maintain competition. A steering committee, which includes major industry stakeholders, has been convened to advise and oversee the consultant's work. Before publication, text and details will be shown at industry events and building envelope councils, in order to achieve the greatest exposure and acceptance as well as receive constructive input. It is expected that the manuscript will be completed by May 2007 and the new Guide will be published in 2008.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33120200
STATUS : Ongoing

DEVELOPMENT OF GUIDELINES FOR FAN-COIL UPGRADES TO IMPROVE ENERGY EFFICIENCY AND THE INDOOR ENVIRONMENT IN EXISTING MULTI-UNIT RESIDENTIAL BUILDINGS

This study will undertake an investigation of opportunities to improve the performance of fan-coil systems in existing multi-unit residential buildings in terms of energy efficiency and indoor air quality. The study will review heating/cooling fan-coil design, from the historic to the current, as well as design, installation and manufacturing practices. It will also seek to establish the engineering and scientific basis for fan-coil problems such as mold, rust, leakage and noise and categorize design and maintenance opportunities that can lead to a range of potential remediation approaches with varying capital and maintenance cost implications. Two fan-coil preliminary retrofit guides will be developed for discussion that will cover design, implementation and maintenance, one for a technical (designer) audience and one for an owner-property manager audience.

CMHC Project Officer : *Mark Salerno* ***CIDN*** : 36480200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ****NEW****

ENGINEERED BUILDING ENVELOPE SYSTEMS FOR OUTDOOR/INDOOR CLIMATE EXTREMES

CMHC is contributing to a National Research Council project to identify indoor conditions and weather in northern and northern-coastal communities, and select appropriate building envelope assemblies for extreme climates. The project will assess the hygrothermal performance of these assemblies by computational and laboratory testing, measure air leakage by means of blower door tests and produce performance parameters for heating and high humidity climates. The project will also analyze the energy and environmental impact of proposed building envelope assemblies. The research findings will be published in a research report, and presented in seminars throughout Canada and the North. The project began in the winter of 2004 and a final report should be produced by 2008.

CMHC Project Officer : *Barry Craig* ***CIDN*** : 29600200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FIELD REVIEW OF INSULATION RETROFITS OF SOLID MASONRY STRUCTURES

This project will investigate the condition of solid masonry wall assemblies that have been retrofitted with interior insulation to reduce energy use and enhance occupant comfort. Site investigations will visually assess the condition of masonry structures and adjacent insulation and framing layers on the exterior and interior of the wall assemblies. This information is required as there is a general perception in the housing industry that the application of interior insulation to solid masonry wall assemblies will cause the walls to deteriorate due to changes in the heat, air and moisture regimes to which the walls are exposed. This work will result in a compilation of case studies of solid masonry insulation retrofit projects and the development of guidelines for assessing and insulating solid masonry buildings. Case studies will be published as Better Building Case Studies and the knowledge gained through the case studies will be documented in a research publication by November 2008.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 30840200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FIRST UPDATE: BEST PRACTICE GUIDE: BRICK VENEER CONCRETE MASONRY UNIT BACKING

The Best Practice Guide: Brick Veneer Concrete Masonry Unit Backing (BVCMU) will be revised and updated to comply with or exceed requirements in the new 2005 Model National Code and current standards and test criteria that govern masonry construction in Canada. The drawings were refreshed to enhance their readability and modified where needed to conform to current codes and practices. The work should be complete in 2008.

CMHC Project Officer : *Barry Craig*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33860200
STATUS : Ongoing

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1800's vintage houses and apartment buildings. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings. The case study reports will be available by December 2008.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

HIGH PERFORMANCE THERMAL INSULATION SYSTEMS IN BUILDING APPLICATIONS

CMHC will contribute funding to the Institute for Research in Construction (IRC) in support of its efforts to develop a high performance thermal insulation system and its contributions to a related International Energy Agency Annex in High Performance Insulating Systems. IRC will develop new nano-porous materials for use in vacuum insulation panels and the facility required to test and evaluate the insulation system. Based on the development of the material and the testing, IRC will produce a report on the high performance thermal insulation system it develops and the potential applications and guidelines for use. This project will serve as CMHC's contribution to the building of research capacity at the Institute for Research in Construction in the field of high performance thermal insulation systems. Potential applications within building envelope systems will be conceptualized in order to generate awareness of how this futuristic form of insulation may be eventually applied. The project will be completed by December 2008.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33630200
STATUS : Ongoing

INNOVATIVE BUILDING CASE STUDIES

Innovative building case studies document new projects of particular interest to architects and other building professionals. They showcase built projects which use new technologies, sustainable features and innovative planning attributes, among other notable features. As they are completed the studies are showcased on the CMHC website at http://www.cmhc.ca/en/inpr/bude/himu/inbu/index.cfm. New products for 2008 will include case studies of construction waste diversion, the Southfield solar house in Ontario and several other studies from across Canada.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 08400306

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

INNOVATIVE BUILDINGS AND CONTINUING EDUCATION ARTICLES FOR ARCHITECTS

CMHC develops and publishes continuing education articles and case studies of innovative buildings for architects. These publications provide technical information on a variety of subjects, especially those related to building envelope issues. The Innovative Building Case studies provide examples of innovative systems or processes, which can help improve industry knowledge. New web-based learning articles requested by the architects' associations and the documentation of additional Innovative Building case studies are ongoing. The latest online articles include Design, Selection and Commissioning of Window Installations, Integrated Design Process, and Introduction to Solar Design and What Housing Providers Need from their Architects.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 3366-PLN05

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing. The results of the study will be published as a CMHC Research Highlight.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 22010200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hygIRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hygIRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures. The final project report will be available by December 2008.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : N/A

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

PILOT 4-D GRAPHIC TOOL FOR POST-SECONDARY BUILDING DESIGN PROGRAMS

Through this project, an existing high-rise graphic package (as developed for limited use in earlier CMHC Research) will be enhanced to serve as a tool to assist in educating students and practitioners as to the interrelationship of various components (structure, fire suppression systems, cladding, photovoltaics, etc.) on high-rise buildings. The project is intended to determine the market for this type of educational tool within community colleges. To date, the survey tool has been designed and a preliminary list of potential respondents across Canada developed. The project is now expected to be completed by December 2008. This project is undertaken in partnership with Seneca College.

CMHC Project Officer : *Mark Salerno* ***CIDN*** : 32250200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE

The objective of this project is to produce a revised version of CMHC's Brick Veneer Steel Stud Best Practice Guide, published in 1996. New research and user feedback from seminars based on the guide and from CMHC's web site indicate that some details need updating. Partnerships have been developed with interested parties for input, review and promotion. The consultant responsible for the revisions is working with an advisory committee, specific to the BVSS guide, which participates in drafting the new edition. The advisory committee includes practitioners, industry representatives, manufacturers and regulators. The work began with a thorough study of the existing Brick Veneer Steel Stud Guide, including an analysis of users' feedback, followed by roundtable critique sessions. Public sessions were held to discuss the proposed revisions. The consultant then collected the information, produced the revised manuscript and is now in the process of obtaining consensus from the advisory committee. Revisions to the text and details are with the advisory committee for their comments. The revised Brick Veneer Steel Stud Guide should be in print in 2008.

CMHC Project Officer : *Barry Craig* ***CIDN*** : 23780200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

BUILDING SCIENCE BEST PRACTICES

The objective of this project is to consolidate current building science best practices into one comprehensive illustrated source that will serve as a text book and training manual for building science courses. It will be used in architectural programs at colleges and universities, and by builders and designers. The result of this research will be a common reference that describes essential building science for Canadian construction that is based on rigorous scientific research and testing, and that is focused on best practices. It will be tailored to existing teaching curricula and it will be extremely useful to architects, engineers and building scientists resulting in an accurate and common understanding of building science principles and their interrelationship with one another. The manuscript is expected to be complete in December 2008.

CMHC Project Officer : *Barry Craig* **CIDN** : 35610200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION TECHNIQUES AND PRACTICES FOR APPLICATION IN OTHER CLIMATES

This research project will demonstrate how to adapt Canadian wood-frame house construction techniques and practices in other countries with different climates. The resulting research report entitled "Durable Wood-frame Construction for All Climates" is divided into three parts. The first part covers well-established building science principles for building envelope durability. The second part breaks new ground in the development of a series of methods that allows a designer or builder to select a particular wall construction based on local site conditions and climatic data drawn from sources, such as the NASA weather data base maintained on the world wide web. The third part provides examples of durable wood-frame building assemblies for all climates. The report focuses on the durability of the building envelope, and covers other related aspects of construction (e.g. ventilation and termites). The project is expected to be complete by the end of 2008.

CMHC Project Officer : *Barry Craig* **CIDN** : 27290200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

GLOSSARY OF HOUSING TERMS - UPDATE

This project reviews the current edition of Glossary of Housing Terms and conducts research to identify new terms and definitions which are missing. The Glossary of Housing Terms was last updated in 1995, resulting in the absence of a number of new housing terms, some of which are included in CMHC's new information products. A few examples of new housing terms missing from the Glossary of Housing Terms include: surfactants, enthalpy recovery ventilator, building science, polyolefin, xeriscaping, pyrite, stachybotrys chartarum and brownfields. All the existing terms and definitions have been reviewed to ensure they are still appropriate and that the definitions are accurate. Construction related acronyms and abbreviations, and terms common to multiple unit residential buildings have been added. The revised Glossary of Housing Terms should be available in 2008.

CMHC Project Officer : *Barry Craig* **CIDN** : 33070200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

IMPROVED PREDICTION OF SEISMIC RESISTANCE OF PART 9 HOUSES

Currently available approaches for the prediction of seismic resistance of conventional wood-frame construction (that is, buildings conforming to Part 9 of the NBC) are not able to predict the seismic resistance in a reliable manner. Experience in earthquakes and recent shake table tests of two-storey specimens have demonstrated generally good performance, but the limitations of this favourable behaviour are not well defined. A funding grant from CMHC External Research Program has been provided to Forintek Canada Corporation (FP Innovations) to undertake a research project, to develop simple mechanics-based methods for the prediction of seismic resistance of conventional wood-frame ("Part 9") houses. The work under this grant will present a quantitative basis for possible Part 9 seismic provisions of the NBCC based on data from past and ongoing work at Forintek and pertinent data from the literature. The work will limit itself to regular geometric shapes of wood-frame construction and will not consider torsional seismic effects. The project is expected to be completed by December of 2008.

CMHC Project Officer : *Silvio Plescia*
CIDN : 34380208
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

REDESIGN PRODUCTION PROCESS IN HOUSING CONSTRUCTION USING LEAN PRINCIPLES AND VALUE STREAM MAPPING

The housing construction sector is distinguished from other parts of the construction industry and offers the closest analogy to the manufacturing industry. However, the home building process is still managed in the same way as in other sectors of the construction industry. The aim of this External Research Program project is to develop a lean process for housing construction that improves the efficiency and reduces overall throughput time.

CMHC Project Officer : *Barry Craig*
CIDN : 36260202
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SEISMIC UPGRADES TO LOW-RISE HOUSING

The focus of this research project is the formulation of options for improving the earthquake preparedness of residential wood frame housing in British Columbia. The report addresses both new and existing single family and multi-unit wood frame construction. The project report is based on two major research projects conducted at UBC; the Earthquake 99 Project and Development of Bridging Guidelines. The earthquake damage estimates given in the report are based on sophisticated non-linear time history analysis of a comprehensive range of wood frame buildings. This type of analysis generates a realistic prediction of earthquake damage based on a probabilistic, performance-based methodology. Underlying soil type has a profound impact on earthquake damage of buildings; the reports' analysis is based on the assumption that 60% of housing units in south-west BC are founded on high-amplification soils. Earthquake damage is related to performance objectives: Life Safety (a measure of the occupant safety during the main earthquake event) and Habitability (a measure of the occupant safety during after-shocks).

CMHC Project Officer : *Silvio Plescia*
CIDN : 25380200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOUSING DESIGN

DESIGN FOR INCLUSION TOOLKIT

The Design for Inclusion Toolkit was sponsored by Canada Mortgage & Housing Corporation, in collaboration with the City of Vancouver, to promote the inclusion of Universal Design as an integral part of all building designs.

Designing for Inclusion is a concept that embraces universal access for all people, regardless of age, height, skill, or physical ability. While building codes set a minimum standard regarding accessibility, "universal design" seeks to go beyond those codes to make the built environment usable by all people without the need for adaptation or often prohibitively expensive retrofits. "Universal design" principles strive for simple and intuitive uses integrated seamlessly into building designs, such that accessible design features are indistinguishable from the overall design of the project.

The need for the Toolkit was expressed by a group of over 80 building, construction and development professionals participating in the Design for Inclusion at South East False Creek Workshop held in November 2006. The workshop was a partnership between Canada Mortgage and Housing Corporation and the City of Vancouver. Feedback from workshop participants identified a desire for practical and applicable design solutions that support Universal Design principles.

In response, the Toolkit was developed as a resource for developers, designers, and builders to use as part of their design palette. The toolkit is a compilation of basic universal design elements synthesized into one document. It includes a Universal Design Matrix, illustrative design examples, a checklist of basic elements that should be incorporated into a project, and a bibliography for further research and/or information.

The source documents are from Canada Mortgage and Housing Corporation publications, City of Vancouver policies and regulations, and advice provided by community advocates. The design elements outlined in the matrix and checklist were reviewed by stakeholders and peers in the design and development industry.

Prepared by Cindy Chan Piper, Piper Designs Inc. CMHC Project Officer: Lucia Su. Sponsored by Canada Mortgage and Housing Corporation in collaboration with the City of Vancouver. Ottawa: Canada Mortgage and Housing Corporation, 2008. 67 pages (5373 KB)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Design_for_%20Inclusion_Toolkit.%20pdf.pdf

HOUSING RESEARCH

CONTRIBUTION TO RESEARCH PROJECTS AT THE CANADIAN CENTRE FOR HOUSING TECHNOLOGY

In co-operation with NRC and NRCan, CMHC will continue to support research projects to evaluate energy efficiency technologies on the performance of the test houses at the Canadian Centre for Housing Technology (CCHT). Several technologies have already been evaluated at the facility, and research reports are available from the CCHT web site http://www.ccht-cctr.gc.ca/documents_e.html. CMHC Research Highlights on 5 of these projects are available from CMHC's Web site. Several other projects are being considered for testing and evaluation by the CCHT's Research Committee, which represents the three partners, Canada Mortgage and Housing Corporation, Natural Resources Canada and the National Research Council of Canada.

CMHC Project Officer : *Ken Ruest*

CIDN : 32090200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SUPPORT FOR THE 12TH CANADIAN BUILDING SCIENCE AND TECHNOLOGY CONFERENCE, MONTREAL, QUÉBEC, MAY 2009

CMHC will support the 12th Canadian Conference on Building Science and Technology, Montreal, Québec, May 6-8, 2009. CMHC has supported past Canadian Conferences on Building Science and Technology in recognition of the important role that the conferences have played in the dissemination of technical housing research, the promotion of sharing technical information and discussion of knowledge and experiences by the building science community and the importance of a Canadian forum for building science issues. Copies of the conference proceedings will be available on loan from the Canadian Housing Information Centre immediately after the Conference.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 37490200
STATUS : Ongoing
****NEW****

INDOOR ENVIRONMENT

CMHC PARTICIPATION IN THE HEALTHY INDOORS PARTNERSHIP (HIP)

This project is a collaboration between government, industry and the private sector to implement the Healthy Indoors Partnership (HIP) vision and business plan for improving indoor environmental quality in Canada. The mandate of the Healthy Indoors Partnership, incorporated in 2003 as a not-for profit organization, is to bring industry, government and nongovernment organizations together to identify, develop, implement and manage activities, such as inter-agency research, designed to create healthier indoor environments in Canada. CMHC will collaborate on HIP Indoor Air Quality consultation. In May 2004 the HIP released proceedings from an expert/stake holder consultation on mold in the indoor environment. HIP has also held round tables on filtration in residential dwellings and produced a buyer's guide for consumers in the fall of 2006. A round table on Low Emissions Materials, Products, and Services was held in February 2007. Consumer and industry guides will be produced on this subject.

CMHC Project Officer : *Ken Ruest*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30510200
STATUS : Ongoing

INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT

CMHC has contributed to a study investigating the relationship between indoor air quality and severe respiratory tract infections in Inuit infants in Baffin region, Nunavut. The initial work was carried out in conjunction with the Children's Hospital of Eastern Ontario, Health Canada, Natural Resources Canada, the Nunavut government and Nunavut health and housing agencies. Testing took place over the winter of 2003 in 20 houses in Cape Dorset. It included air quality measurements, blower door testing, and long term air change rate measurement. These results show that some of the houses are under ventilated, but that air quality is similar in many aspects to more southern housing. A follow-up project with the partners explored ventilation solutions in Nunavut communities. The second phase surveyed air change rates, carbon dioxide levels, and occupancy factors in 100 houses in four Nunavut communities, to see if the Cape Dorset results are typical. Low ventilation rates were measured in many of the houses and corresponding high CO2 concentrations resulted. A CMHC Research Highlight on the pilot project and the 100 house survey has been issued ("Nunavut Housing Ventilation Research 2003-2005", Research Highlight Technical Series 05-116). The current phase involves the installation of HRVs in 100 existing

Nunavut houses and an analysis of the effects on occupant health. The project team hoped to have the HRVs installed in the fall of 2006, with the health monitoring taking place over the winter of 2006/2007. However, problems with weather, contractor performance, equipment installation, and finding test houses delayed the work. Currently, there are about 63 HRV units installed in four communities. Their operation is being verified in the fall of 2007, and the occupants' health will be monitored over the winter of 2007-2008.

CMHC Project Officer : *Don Fugler*
CIDN : 27570200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Research highlight is available

LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE

This initiative delivers information on indoor air quality in the home to targeted audiences, the end result of which will benefit Canadian homeowners and occupants. Basic information to increase awareness and appreciation of indoor air problems is through the one-day Let's Clear the Air seminar (for housing and health professionals) or the Build and Renovate to Avoid Mold workshop (for builders, renovators, architects, real estate and insurance appraisers). A new two-day Mold Remediation Workshop trains builders, renovators and contractors on how to remediate mold safely and properly. Qualified individuals can also proceed to the CMHC Residential Indoor Air Quality Investigator Training Program. Individuals who complete the training program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact Virginia Salares (e-mail vsalares@cmhc.ca, tel 613 748-2032, fax 613 748-2402) for admission requirements and application forms. For referral purposes, a list of persons having completed the training is available from CMHC offices.

CMHC Project Officer : *Virginia R Salares*
CIDN : 16230300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Seminar/training is available

RADON MITIGATION PLANNING INSPECTION AND MITIGATION SYSTEM INSTALLATION

The Radiation Protection Bureau of Health Canada (HC) released a new, lower radon guideline (200 Bq/m^3) and is planning to increase public awareness of radon risks. HC has also had drafted a protocol for radon remediation in houses to help homeowners and contractors solve radon problems. Before general release of the protocol, HC piloted its use on a high-radon house to ensure that the recommendations and sequencing are appropriate for Canadian conditions. CMHC managed the research field work and provided building science and other technical support to the testing, remediation work, analysis and reporting.

The house selected was a two year old, two storey suburban house in the west end of Ottawa. It had initial radon concentrations of about 1400 Bq/m^3, despite having polyethylene under the slab and no apparent holes in the foundation. A common radon mitigation measure, sub-slab depressurization, worked well at reducing indoor radon concentrations to under 50 Bq/m^3.

Prepared by Arthur Scott and Associates on behalf of Health Canada and CMHC. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2008. 33 pages (6784 KB)

Note: No. 08-105 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 66063)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Radon_Mitigation(W).pdf

REVIEW OF THE RELATIONSHIP BETWEEN HOUSE VENTILATION RATES AND HEALTH

This work would attempt to establish the relationship between adequate ventilation and health (or inadequate ventilation and poor health), through literature searches and appropriate field testing. The project should lead to a better understanding of the relationship between house ventilation and occupant health. If the project establishes a strong correlation between good ventilation and healthy residents, it will be useful material for building codes, medical authorities, ventilation standards, and the ventilation industry. Currently, CMHC is investigating the possibility of coordinating this research with the Canadian Institute for Health Research (CIHR) or the Quebec public health agency (INSPQ) to see if their planned research projects would complement CMHC's objectives.

CMHC Project Officer : *Don Fugler* **CIDN** : 35560200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

TESTING THE DEPRESSURIZATION RESISTANCE OF GAS AND OIL FURNACES

CMHC and NRCan have been cooperating in the development of a test protocol for determining the spillage resistance of residential combustion appliances. There was initial testing of both gas and oil appliances. The test protocol and structure is relatively simple and robust. Some appliances are able to operate under high levels of depressurization better than others. The current research project extended the results through supplemental testing of 10 additional gas appliances. The results are promising. As in the earlier research, most of the "spillage resistant" appliances did pass the 50 Pa depressurization test. The eventual goal is to integrate depressurization testing into appliance standards, and a CSA committee is being set-up to examine this issue. CMHC also wishes to test vertically-vented, mid-efficiency oil furnaces with improved spillage resistance, but have not located suitable Canadian appliances so far.

CMHC Project Officer : *Don Fugler* **CIDN** : 36030200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

YEARLY VARIATION IN BIOLOGICAL CONTAMINANTS

Ten houses that have previously been characterized for biological contaminants during the winter have been retested a year later to determine the variability of microbiological markers. The data is being analyzed to identify climatic and other factors that may affect year to year measures of biological contaminants in houses. The validity of "one point in time" testing to characterize multi-year biological contaminant loads in houses during the winter will be assessed. This project will increase knowledge of yearly winter variations in microbiological loads in houses, and of testing procedures that provide the most repeatable long term building microbiological markers. One potential outcome would be the confirmation that CMHC's methodology of assessing IAQ problems by inspection alone is still the most accurate assessment of biological contamination without expensive testing or lab analysis. This may also indicate which testing methodology represents the most stable indicator of long term biological indicators in houses. The results will be available in 2008.

CMHC Project Officer : *Ken Ruest* **CIDN** : 32160200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MANUFACTURED HOUSING

FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY-DETACHED CONSTRUCTION

This External Research project is studying the economic feasibility of using an automated, mobile plant to produce houses that are 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built (with basement foundations pre-installed), and once the construction program is complete, the plant would be dismantled and shipped to the next locale. The final report has been received and has been reviewed by the Manufactured Housing Institute Canada and the Federation of Canadian Municipalities. The report is being edited and layouts for a typical community master plan are being developed, including alternate street designs and mobile plant locations.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 23050201
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MOISTURE AND MOLD

CONTRIBUTION TO THE INDUSTRIAL RESEARCH CHAIR IN ALLERGENS AND TOXINS FROM MOLDS IN THE BUILT ENVIRONMENT

There is no method to obtain a quick and inexpensive determination of the nature of mold contamination in a house. A more fundamental understanding of the by-products of mold that are harmful to people is needed along with knowledge regarding the thresholds that should be avoided and cheap and reliable ways of classifying moldy and non-moldy houses. CMHC is supporting the ongoing research of the National Science and Engineering Research Council Chair on Allergens and Toxins from Molds in the Built Environment at Carleton University. The first five years work of the Chair developed the expertise to identify human allergens, produce antibodies specific to each allergen and isolate and test the effect of toxins on lungs from Stachybotrys chartarum, Aspergillus versicolor and Penicillium chrysogenum, three representative fungi found in houses that require large, medium and low amounts of moisture. The second five years, starting in June 2006, will expand the expertise to a larger number of molds to make it feasible to use these reagents as a cheap and reliable way of testing for mold contamination in houses.

CMHC Project Officer : *Virginia R Salares* — ***CIDN*** : 34070200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF DRIVING RAIN MAPS AND LOADS FOR CANADA

The objective of this External Research project, undertaken by Prof. John Straube, University of Waterloo, is to review the nature of rain and explore the mechanisms involved in wind-rain-building interactions. The rain-wind-building interaction is considered in four parts: the nature of rain, the coincidence of wind and rain at the site, driving rain, and the interaction between building's specific wind and rain. This project is expected to be completed by fall of 2008.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 26470207
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DYNAMIC BUFFER WALLS

Moisture control within new and renovated buildings in cold climates is a critical design component for the successful performance of the exterior building envelope. Currently, moisture control is achieved by architectural means through integral air barrier assemblies on exterior wall and roof assemblies. Some construction practices and operational activities often render these assemblies ineffective resulting in premature assembly failure. The dynamic buffer zone (DBZ) is a relatively new way of controlling moisture in the cavity. A DBZ is created by introducing dry conditioned air into and out of interstitial exterior wall cavities by means of dedicated mechanical systems in such a manner as to constantly ensure positive pressure within the cavities relative to interior environments. This light pressurization prevents humid indoor air from leaking into the exterior wall cavity, thus stopping condensation and subsequent moisture accumulation and damage. In fact, it creates an air barrier using air. This project, through actual installations and by computer modelling, aims to develop design guidelines in the use of DBZ by determining the optimal parameters of the air introduced in the cavity. These include: volume, pressure and temperature; the length of time the system needs to be operational, the fan size and number, cavity volume and energy use and payback. The project has been contracted and computer modelling has begun. A search has started for a residential building in which to install a test system.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 33130200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

HOW IMPORTANT ARE DEHUMIDIFIERS IN PREVENTING MOLD IN HOUSES?

This study will test the effectiveness of dehumidifiers in managing relative humidity in basements. Measurements of relative humidity and moisture readings of selected surfaces will be taken in houses of varying ages and characteristics when a dehumidifier is running and when it is turned off. A pilot study of three matched houses in the same area, conducted in the fall of 2004, has recommended that houses in three regions - Ontario/Quebec, BC/Atlantic and Prairies, be studied over a full year period with dehumidification when needed. A larger study will monitor 30 houses in different regions for one year without dehumidification and a second year with dehumidification. The field study has been completed. The report will be released in 2008.

CMHC Project Officer : *Virginia R Salares* — ***CIDN*** : 32170200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

LITERATURE REVIEW ON HISTOPLASMA, BLASTOMYCES AND CRYPTOCOCCUS GATTII AND THE IMPLICATIONS FOR THE DESIGN, OPERATION AND MAINTENANCE OF HOUSING

In this project, experts in fungi will conduct a thorough literature review of Histoplasma, Blastomyses and Cryptococcus gattii, three fungi that cause infectious diseases in people. Histoplasmosis occurs from exposure to feces of birds and bats, while blastomycosis occurs after exposure to the spores in soil. Infections due to cryptoccoccus gattii are limited to Vancouver Island, though cases have been seen in Vancouver. The literature review will form the basis of housing advisories on how to avoid exposure to these fungi. The project is a cooperative effort between CMHC and Health Canada. The literature review has been completed. An About Your House fact sheet is in preparation.

CMHC Project Officer : *Virginia R Salares* — ***CIDN*** : 36350200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ****NEW****

MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM

The objective of this project is to modify and upgrade WALLDRY, a 1980's computer program developed by CMHC, which models the flows of moisture, heat and air through wood-framed outer wall assemblies in response to given external climatic loads and interior temperature and humidity conditions. The original QBASIC code used in WALLDRY will be recast using a Windows-based computing language to overcome the memory management limitations inherent in a DOS based program. The upgrades would also incorporate corrections applied to any of the algorithms from the use of WALLDRY in recent simulation studies, programming enhancements in a user-friendly environment, including input capabilities and a material properties database, and to provide a more useful means of presenting the output of interest. Project completion is expected by spring 2008.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 25050200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MOLD REMEDIATION WORKSHOP

The focus of the Remediating Mold workshop is on information required by builders and contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the workshop incorporates current and substantive information from authoritative sources. This workshop will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation.

CMHC Project Officer : *Virginia R Salares* — ***CIDN*** : 23800200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

POTENTIAL FOR MOISTURE PROBLEMS DUE TO PLASTIC SHEETING IN WALL ASSEMBLIES

This project examined whether plastic air-vapour barriers currently used in Canadian wall assemblies are an asset or a problem. There has been significant criticism recently of the use of plastic in above-grade and basement wall assemblies, in that plastic limits the ability of the wall to dry into the house, and that it provides a condensing plane for water vapour driven into the wall when the sun heats the exterior sheathing. The research assessed the criticisms levelled against plastic sheeting and compared the use of plastic to other alternatives, using field tests and hygrothermal modelling. The first year of field testing in a new house and a test hut was completed in the summer of 2006. Testing took place in basement and above-grade walls. Reporting on the field testing and the ensuing simulation and analysis was published in the fall of 2007. The results were mixed. In some cases, the walls with poly created high moisture situations; in other cases, the no-poly walls had higher moisture and mold.

The field testing of the above-grade walls was extended for another year to look at brick wall venting and alternative vapour barriers (e.g. paint). The report on the second year of field testing should be available in mid-2008.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 32150200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is available — ****NEW****

MOISTURE AND MOLD

WATER PENETRATION THROUGH THINNER VENEER WALL

Ryerson University was awarded a grant, under CMHC's External Research Program, to undertake this research project to study the potential for reducing the thickness of masonry cladding (or redesigning masonry units to be lighter and use less material) and still maintain acceptable durability and water penetration performance. The project will focus on issues of resistance to water penetration and durability and will specifically investigate the impact of dimensional changes on the water penetration into the wall (air) cavity. The project is expected to commence by end of October 2007, with completion expected by end of summer 2008.

CMHC Project Officer : *Silvio Plescia*   ***CIDN*** : 36260215
Division : External Research Program   ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

WIND-RAIN RELATIONSHIPS IN SOUTHWESTERN BRITISH COLUMBIA : FINAL REPORT

Building envelope failures in Southwestern British Columbia have brought to light the strong influence of wind-driven rain on building envelopes. This study examines wind and rainfall data collected throughout the year from 12 meteorological stations: four on Vancouver Island and eight in the Lower Mainland. Results indicate that prominent wind directions during rain, as well as maximum wind speed, vary with location. Furthermore, all stations exhibited a marked difference in the wind direction and frequency of higher wind speeds for wet hours versus all hours.

Prepared by Levelton Engineering Ltd.; R G. Humphries; M. Furberg; C. Koscher; A. McGowan. CMHC Project Officer: Sylvio Plescia. Ottawa : Canada Mortgage and Housing Corporation, 2004. 1 CD-ROM

Note: No. 07-114 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65546)

STATUS : New Completed CD-ROM and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

NORTHERN HOUSING

CMHC CONTRIBUTION TO THE COLD CLIMATE HOUSING FORUM

The Cold Climate Housing Research Centre in Fairbanks, Alaska hosted the 'Sustainable Northern Shelter in A World of Diminishing Resources', the first biennial forum on Sustainable Northern Shelter on October 29 and 30, 2007. The conference was organized to bring northern housing experts together from across the circumpolar region to explore issues, solutions and proposed future research in northern housing. The conference addressed areas that include energy efficiency, sustainable buildings, building science, materials, alternative energy, infrastructure, and the design of northern houses and communities. It was intended that the conference be the first of an ongoing series of northern conferences to occur every other year in different circumpolar regions and countries. The second northern housing forum, to be held in Canada, is being planned for 2009.

CMHC Project Officer : *William Semple*   ***CIDN*** : 36170200
Division : Policy and Research Division   ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FEASIBILITY OF ALTERNATIVE ENERGY EFFICIENT HOUSING SERVICES FOR THE COMMUNITY OF NORMAN WELLS, NWT

This project will evaluate the feasibility of using decentralized services for a proposed small cluster of new houses in the northern community of Norman Wells, NWT. It will evaluate the infrastructure needs for the housing, evaluate the potential for an alternative infrastructure system (e.g. Economad) and make recommendations on alternative systems that could be installed to meet the growing needs for services for housing in the community. This will include the evaluation of the potential for heating with district heating provided by a co-generation plant (either diesel or natural gas fired) with the waste heat being used to heat the houses. As an additional innovation the cluster would be grid connected to provide an electricity back-up and as a demonstration of distributed generation. Based on the recommendations, the study will evaluate the ability of the community to successfully install, operate and maintain the systems. Based on expected energy and other operating costs, the study will include a cost benefit analysis of the alternative systems. The project will be the first phase of a two stage project that will subsequently include the monitoring of the energy and cost effectiveness of the installed decentralized infrastructure systems, if these are selected to supply services to new housing in the community. This project will increase the level of knowledge concerning the viability of alternative systems for the supply of services to northern communities. This project will form part of "Evaluation of Local Building Services serving Clustered Housing in Northern and Remote Communities".

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33270200
STATUS : Ongoing

INNOVATIVE USE OF SHIPPING CONTAINERS FOR SHELTER HOUSING

This two stage project will first assess the feasibility and acceptability of providing shelter for the homeless on a seasonal or as required basis using recycled shipping containers (or other prefabricated components) suitably modified for Canadian housing needs. The project will proceed to a second stage if the approach appears suitable and cost effective for either or both southern and northern communities. Demonstration shelter units will be serviced by micro utility modules (or external utility rooms) according to on site infrastructure needs. All components of the project will be portable and relocatable as the need or demand indicates, as well as being aesthetically acceptable and fully functional. The project will demonstrate a low cost portable system to provide seasonal shelter of good quality for the homeless, but is not intended as a replacement for long term conventional housing.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31890200
STATUS : Ongoing

INTEGRATED DESIGN AND EVALUATION OF A CONSTRUCTED NORTHERN SUSTAINABLE HOUSE (E/2 PROTOTYPE)

In this partnership project, two "Sustainable Northern Houses" have been designed by CMHC in partnership with a Tr'ondek Hwech'in First Nations community in the Yukon and the Nunavut Housing Corporation in Arviat, Nunavut. The houses have been designed to consume less than 50% of the Model National Energy Code of Canada for Houses energy requirements, and are suited to the northern culture and lifestyles. The project has incorporated knowledge and connections that were gathered in northern design charrettes, with the design work for each Sustainable Northern House carried out in consultation with the northern community and territorial northern housing provider. Construction of the Tr'ondek Hwech'in House was completed in January, 2008. Materials for the NHC Arviat House will be sea-lifted to the community during the summer/fall of 2008 with construction to be carried out in the fall of 2008 or spring of 2009. The evaluation of the project will include monitoring the energy performance of the constructed houses, carrying out a cost/benefit analysis of the energy savings of each Sustainable Northern House vs. a typical new house in the community, and carrying out an analysis of the success of the cultural issues being addressed in the design. CMHC facilitated design workshops, was the lead in designing the houses, and is undertaking the performance evaluation of the Sustainable Northern House Prototypes. A 15 month monitoring project on the completed Tr'ondek Hwech'in House began in February 2008. The project is sponsored in part by the Program for Energy Research and Development (PERD). The research will be completed by December 2010.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33240200
STATUS : Ongoing

INTEGRATED DESIGN PROCESS IN THE NORTH

The project involves working with northern communities, and northern housing agencies to integrate community housing needs, building design, construction and delivery to support sustainable northern development. In some communities this project will support elders visioning sessions designed to assist with identifying community priorities. Residents will be consulted to identify their housing needs and desires as well. In communities where design charrettes have been carried out, the project will support additional workshops on specific sustainability issues, innovative products and strategies to address these issues, and could include research support, monitoring and quality assurance of specific green technologies such as water harvesting, ventilation design, culturally appropriate building design, demonstrations and training, etc. Priority will be given to communities that are ready with sustainable development initiatives and to support the results from previous charrettes. Community commitment will be an important element for all the initiatives. This project will provide a supportive framework to assist in establishing a community vision of sustainability prior to building and community design charrettes, will provide a follow up to community design charrettes by assisting and facilitating work to move from concept to more specific plan, assisting the community in developing an implementation strategy for its sustainability initiative.

The first Integrated Design Process (IDP) was carried out in the design of two versions of the culturally appropriate, energy efficient Northern Sustainable House prototypes, -- one that has been constructed in the community of Dawson City, Yukon and a second to be built in Arviat, Nunavut. The IDP project documented the use of design charrettes, the design process carried out by the design teams, and input from the charrette participants on the design process and the house designs for each community. The Sustainable Northern House IDP project was completed in December 2007 with a report available in the spring of 2008.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 35740200
STATUS : Ongoing

NORTHERN HOUSING

REDUCING ENERGY USE OF NORTHERN HOUSING BY HALF - PART 3: BUILDINGS AND COMMUNITIES / INTEGRATED DESIGN CHARRETTES FOR SUSTAINABLE BUILDINGS AND COMMUNITIES

As part of the intergovernmental strategy to reduce energy requirements in the North and improve housing conditions, Integrated Design Charrettes are being carried out in northern communities with the residents/builders and community leaders with the goals of sustainable improvements and lower costs in their buildings and communities. The strategies generated from this initiative will enable northern communities to reduce energy and water costs significantly. This project involves the organization and facilitation of community design charrettes in northern communities to formulate improved solutions to meet their evolving housing needs. The charrettes provide an opportunity to align the thinking of various experts, community builders, local inhabitants and municipal leaders about the potential for the design and construction of sustainable northern housing as well as a thorough discussion of the barriers and challenges that must be overcome. It will also provide a technique for northern communities to rethink their community plans, their process of design and better northern housing delivery options using sustainable objectives which are adapted to their needs. The charrettes will be completed by the end of 2008. A report documenting the outcome of each or all charrettes will be available following each event.

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 33690200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

See also: SUSTAINABLE HOUSING IN THE NORTH, p. 60

INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT, p. 34

ENGINEERED BUILDING ENVELOPE SYSTEM FOR OUTDOOR/INDOOR CLIMATE EXTREMES, p. 27

PROPERTY MANAGEMENT

INDOOR AIR QUALITY TROUBLESHOOTING GUIDE FOR PROPERTY OWNERS AND MANAGERS

A guide for identifying and resolving indoor air quality problems in multi-unit residential buildings will be developed for property owners and managers. The guide will provide instructions for detecting, identifying and resolving common problems relating to the indoor environment in both common areas and individual apartments. Information will also be provided as to when such activities should be referred to an expert. The guide is primarily directed at owners and managers but the information on specific problems and solutions will be presented in such a way that it could be provided to the occupants of individual apartments. The project will be completed in 2008.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 3050-PLN03
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RENOVATION AND INSPECTION

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE PHASE II

The overall objective of this multi-phased Canadian Home Inspector and Building Official (CHIBO) national initiative is to raise the level of competency of the private home inspection industry, the municipal building officials, and the First Nations building officers and establish a qualified and recognizable industry to better serve their clients. Phase I activities resulted in the development of Occupational Standards for each of these sectors. Phase II, which built on the results of the Phase I, is now complete. The primary objectives of Phase II, to develop certification and accreditation models for the inspection industry, have been met. The certification and accreditation models were implemented by the industry sectors in 2006. Technical Research Highlight 04-112 summarizes this research project and is available on the CMHC Web site. The certification and accreditation for the Building Officials is being implemented.

CMHC Project Officer : *Ken Ruest* — ***CIDN*** : 25150200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Research highlight is available

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS (CHIBO) - PHASE III NATIONAL INSPECTION INITIATIVE

The purpose of this partnership project is to assist the Alliance of Canadian Building Officials' Association (ACBOA) to implement CHIBO developed models for national accreditation and certification of building officials. CMHC support is being used to pilot the certification model, to develop necessary application assessment tools, to establish governance committees and boards as required by the certification models. The implementation of the National Certification and Accreditation program for municipal building officials will help to harmonize the knowledge and experience requirements for building officials and enhance the capacity and standing of the building officials' industry in Canada. The implementation of the National Program is to be completed by the end of March 2008.

CMHC Project Officer : *Ken Ruest* — ***CIDN*** : 35040200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

See also: Socio-economic research on Renovation and Inspection, p. 78-79

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

ADVANCEMENT OF COMPETENCY IN INTEGRATED SUSTAINABLE BUILDING DESIGN - SUPPORT OF CONCORDIA UNIVERSITY IN THE 2005 'SOLAR DECATHLON'

In this project, and as one of various contributors, CMHC supported the Canadian team entry led by Concordia University to participate in the 2005 Solar Decathlon in Washington D.C. Based on a preliminary competition, nineteen teams were selected to participate in this event; the majority of the teams were from the United States, with one each from Canada, Spain and Puerto Rico. The nineteen university teams built small solar houses, of about 60 to 70 square metres in size, on the National Mall in front of the Capital Building in October 2005. The objective was to design a completely solar powered house that is self-sustaining for an entire week. Specified requirements included minimum lighting levels, acceptable interior temperature range, water usage and hot water temperature levels. The houses had to be able to accommodate normal domestic tasks such as laundry, cooking and showering. CMHC's involvement included financial and implementation support to the process, technical advice and guidance, and creating and transferring knowledge on renewable energy based sustainable housing. This project's overall outcomes are: 1) to illustrate how solar energy can improve Canadians' quality of life: solar energy is clean; it significantly reduces pollutant emissions; and solar energy is renewable thereby increasing a nation's energy security; 2) to teach the solar decathletes and the public about how energy is used in their daily lives and to illustrate the energy intensity of various daily activities; 3) to demonstrate that market-ready technologies exist that can meet the energy requirements of our daily activities by tapping into the sun's power; 4) to meet these needs while providing an attractive structure in which to live, work and play. A related long-term objective of this project is to build enhanced alliances between project partners leading to the capacity development for a future Canadian Solar Decathlon competition. A final summary report will be available in 2008.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 32060200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ANALYSIS OF RENEWABLE ENERGY POTENTIALS IN THE RESIDENTIAL SECTOR THROUGH HIGH RESOLUTION BUILDING ENERGY SIMULATION

Due to recent advancements in renewable energy technologies such as photovoltaic (PV) and micro-wind turbine systems, the potential for large-scale deployment of such energy sources for a more sustainable society has never been greater. This research provided a detailed techno-economic assessment of renewable energy potentials in the residential sector through high-resolution building energy simulation using large numbers of representative housing data. Two sub-projects were presented. The first was on the modeling, simulation and feasibility analysis of the hybrid heating system with solar photovoltaics for new housing in cities across Canada. Findings relate to both increase and savings aspects of actual energy use. The analyses also showed the varying energy and environmental benefits of the proposed hybrid heating system in a typical R-2000 home. The second sub-project was on the modeling, simulation, and feasibility analysis of the hybrid building integrated renewable electricity system in the existing Canadian residential stock. The results were extrapolated to the national level to assess the potentials of greenhouse gas (GHG) reduction and were found that using these technologies could result in the GHG reductions of 15% and 20% of the base case emission levels without the proposed hybrid renewable electricity generation systems.

CMHC Project Officer : *Woytek Kujawski* ***CIDN*** : 28370205
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF A SUSTAINABLE PERFORMANCE ASSESSMENT TOOL FOR HOUSING

An External Research project was initiated to develop a sustainability performance assessment tool for housing in Canada. The project provides a framework that permits a broad-scope sustainability assessment of multi-family housing in Canada. The framework is based on SBTool, an internationally accepted assessment toolbox that allows specific ratings to be produced for a variety of regions and end uses, by adjusting scope, weights and (local) benchmarks. The system covers a full range of environmental, social and economic variables, provides internal calculation tools for the estimation of Green House Gases, based on regional emission values, and also an approximate embodied energy calculator. The version provided to CMHC has been calibrated for multi unit residential buildings, but other alternatives, such as mixed use buildings (for example residential and retail) can also be assessed. The tool with its Guide (Overview) is available for download at iiSBE (International Initiative for a Sustainable Built Environment) Website: http://iisbe.org/iisbe/sbc2k8/sbc2k8-download_f.htm A Research Highlight that describes the tool will be available in 2008.

CMHC Project Officer : *Woytek Kujawski* ***CIDN*** : 28920211
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

ECOHOME DEMONSTRATION (BASED ON THE WORLD HOUSE PROJECT)

The ecoHOME is a full-scale travelling exhibit that is intended to showcase a typical dwelling unit incorporating features of CMHC's Healthy and Flex Housing initiatives. The dwelling unit will provide ideas and inspiration to enable Canadians and housing industry professionals to adopt such features into existing or new homes.

CMHC Project Officer : *Mark Salerno*	***CIDN*** : 36470200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	****NEW****

ENCOURAGING TECHNICAL INNOVATION IN MURBS (PART 2: MONITORING AND DOCUMENTING THE TORONTO HEALTHY HOUSE)

The purpose of this project is to (1) monitor the time and seasonal related energy and water uses, indoor environmental quality and the energy production of the solar elements in the Toronto Healthy House; (2) benchmark the performance of the innovative technologies used in the Toronto Healthy House.

CMHC Project Officer : *Duncan Hill*	***CIDN*** : 36940200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	****NEW****

EVALUATION OF THE IMPACT OF ENERGY EFFICIENCY AND SUSTAINABLE DEVELOPMENT MEASURES ON AFFORDABLE HOUSING

This External Research Program study will analyze the impact of including energy efficiency and sustainable development (treatment of grey water, "green materials") measures on the operation of community housing buildings. The analysis will deal with actual energy costs vs. projected costs, the costs of maintenance service and the effects on maintenance practices.

CMHC Project Officer : *Duncan Hill*	***CIDN*** : 36260210
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

MAXIMIZING ENERGY EFFICIENCY IN A MULTI-UNIT RESIDENTIAL BUILDING: AN APPLICATION OF DESIGN AND MONITORING STRATEGIES TOWARDS NET ZERO

This project will support the design and development of a sustainable seniors housing project in the South East False Creek area of the City of Vancouver. The project will embody as many innovative design and construction features to ensure that the building achieves a high level of performance in terms of energy and water efficiency, indoor environment, environmental impact and resource consumption. The design and construction processes will be documented, quality assurance and performance monitoring plans will be devised, deployed and documented, occupant, manager and owner surveys conducted and a final report prepared documenting the outcomes of the project. Construction is expected to commence in 2008 with the final report delivered in 2011. Regular progress reports will be made available as significant milestones are achieved.

CMHC Project Officer : *Lance Jakubec*	***CIDN*** : 36090200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

MEASURING SOLAR PERFORMANCE

The purpose of this External Research Program project is to build and operate a measurement and monitoring program to evaluate the performance of a conventionally built house which uses a range of active and passive solar systems. It is fully off-grid, self sufficient in energy and includes a number of technologies. The intent of the project was to install and operate a number of small data collection systems over a three year period. In the fall of 2007 the monitoring moved to an alternate data management system which will produce better final results, and will give a comprehensive view of the actual performance of the house in regular use, including its operating environment. The project will continue for one additional year until January 2009.

CMHC Project Officer : *Woytek Kujawski*	***CIDN*** : 28920212
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

NSERC CANADIAN UNIVERSITY NETWORK ON "SOLAR ENERGY UTILIZATION IN BUILDINGS"

CMHC is supporting a new Natural Sciences and Engineering Research Council of Canada (NSERC) funded University Network on "Solar Energy Utilization in Buildings", to achieve the objective of enhancing the capacity of the residential industry to develop solar buildings with substantially reduced purchased energy needs. The overall vision of the Network over its five year period will be to advance the adoption of new knowledge, tools, practices and technologies for cost effective construction of solar zero-net-energy buildings in Canada. The main objectives of the Network over its five-year research program are the following:

1. To develop effective techniques for integration of solar collection, storage and utilization systems in the building envelope.
2. To develop and improve solar energy utilization technologies so as to reduce cost and raise overall efficiency.
3. To develop and demonstrate affordable, reliable, building integrated, distributed power generation systems based on solar energy for residential and commercial buildings.
4. To develop simulation design tools and methodology that may be effectively utilized throughout the design process.
5. To transfer these outputs to the end users.
6. To contribute to the development of government policies and programs aimed at fostering the adoption of solar technologies in buildings.

The Solar Buildings Network began its first year of a five year work plan in 2006.

CMHC Project Officer : *Douglas Rowland*	***CIDN*** : 34020200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

PAYBACK PERIOD FOR "GREEN" BUILDING FEATURES IN SINGLE FAMILY DETACHED DWELLINGS

This project will compare the payback period for a variety (25 to 40) of "green features", while also outlining the environmental and technical advantages / disadvantages of each feature. This project will establish estimates on the payback periods of different green features available for single family detached dwellings. It will increase the understanding of the costs and benefits of "building green" in the single family market. It will enable consumers and the home building industry to objectively evaluate "green" features that they wish to incorporate into their homes.

CMHC Project Officer : *Duncan Hill*	***CIDN*** : 3832-PLN08
Division : Policy and Research Division	***STATUS*** : Planned
AVAILABILITY : Product is not yet available	****NEW****

REGINA AFFORDABLE SOLAR HOUSING

Current economic and demographic conditions have led to a well recognized need for the creation of a diverse array of affordable housing solutions across Canada. At the same time, it is critical that housing built today provide a healthy environment that is sustainable in terms of energy and resource use and impacts on land, air and water. This project addresses these combined challenges by developing affordable solar urban infill housing design solutions that revitalize urban environments, dramatically reduce impacts to natural systems, and create affordable and desirable communities to live in. The project output will be a descriptive and visual presentation of affordable solar housing designs for specific urban sites in Regina, developed by graduate students in the McGill University School of Architecture program, and targeted to the designer, builder and developer audiences. The project is a partnership between CMHC, the City of Regina, McGill School of Architecture Affordable Housing Program, and the Saskatchewan Housing Corporation. Results will include general information on the innovative design studio approach, concept designs and examples of affordable solar housing designs for specific sites in Regina.

CMHC Project Officer : *Douglas Rowland*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28020200
STATUS : Ongoing

SOUTHFIELD SOLAR HOME MONITORING AND EVALUATION CASE STUDY

This project is a partnership between Natural Resources Canada and Canada Mortgage and Housing Corporation, with the participation of Thomasfield Homes Ltd., and Nexus Solar Corporation. The project will describe the design, and do modelling and monitoring of the Southfield solar EnviroHome in Guelph, Ontario, to indicate the measured energy delivery of each of the Southfield's renewable energy system upgrades as compared to the conventional systems in the Argyle house (next door), and to a hypothetical Southfield house built to Ontario Building Code standards. The houses are of similar size with similar market features except that the Southfield house incorporates passive solar design, a solar domestic hot water system, and photovoltaic panels, as well as some other advanced energy systems including a demand water heater, and is built to the EnviroHome standard. The project results will provide an understanding of real field results through on-site research/monitoring, and reveal the successes and remaining challenges of incorporating commercially available renewable energy systems into a standard housing development. The study will also create a reporting format for identifying and comparing key features of energy-efficient houses. A final report and CMHC Case Study on the project will be available in 2008.

CMHC Project Officer : *Douglas Rowland*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 29790200
STATUS : Ongoing

SUPPORT FOR THE GREENING OF THE CÔTEAU VERT PROJECT

This research project will document the development of one new green affordable housing development in Montreal, Quebec - Côteau Vert. CMHC will support the identification of green products, equipment, systems and practices and the analysis of the related costs, benefits and implementation/operational considerations. This information will be used to support decisions regarding the innovative features to be included in the building project. Quality assurance, commissioning and monitoring protocols will be developed to support the implementation of the innovative features. The design, development and construction processes will be monitored and documented to provide information for the residential construction industry on how green building projects move from the design stage to completed buildings.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 37560200
STATUS : Ongoing
****NEW****

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

TAP THE SUN: REVISION AND UPDATE

CMHC's new, updated "Tap the Sun" publication provides information on solar design for Canadian homes. It builds upon the earlier version and this will help to ensure that the publication continues to be one of the premier passive solar design resources available to consumers and the residential construction industry. The revised publication contains new information on the Integrated Design Process (IDP) as an essential step in the delivery of passive solar designs. The new "Tap the Sun" has been structured to allow potential users to read the entire book or to go to sections for comprehensive information on specific subjects. This approach allows relatively uninformed readers to learn about passive solar design strategies and provides sufficient knowledge to allow for the participation in a design of a passive solar house. The publication contains updated design data, envelope information particularly with respect to new window technologies, and the latest developments in solar thermal systems and photovoltaics, well detailed case study projects, new references to occupant health and comfort, mechanical and electrical systems and identified key resources. A companion CD includes improvements/updates to the integrated tools such as the Comfort Design Checker.

CMHC Project Officer : *Woytek Kujawski* ***CIDN*** : 25450200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

WORLD HOUSE PROJECT

The World House Project involves a multi-disciplinary team including professionals and students, in the research, design and building of a universal, sustainable house and housing system. The goals of the project are to design and prototype a housing system that achieves a balance between extremes of urban sprawl and urban slums; to encourage and facilitate the building of sustainable, universal, and healthy human dwellings and communities; to share the results; and to train students.

CMHC Project Officer : *Mark Salerno* ***CIDN*** : 34850200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

See also: Socio-economic research on Sustainable Development & Healthy Housing, p. 90-92

WATER CONSERVATION, REUSE & MANAGEMENT

ALTERNATIVE STORMWATER MANAGEMENT - WATERSHED RESTORATION

This work will see the development of a number of integrated stormwater planning, design and management tools for builders, developers, and municipal staff. These tools will assist in smart urban development by providing a means for assessing watershed health and prioritizing areas for restoration thereby allowing stakeholders to make informed choices on urban development and stormwater management. The ecologically engineered storm water management tools presented here will improve stormwater drainage systems, improve water quality and reduce the negative impact of stormwater infrastructure on the environment by utilizing an ecological system that has a greater resilience to drought and flooding in the face of climatic changes. Project completion and report submission are scheduled for spring 2008.

CMHC Project Officer : *Catherine Soroczan* ***CIDN*** : 33880200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DO PRESSURIZED AT-GRADE ON-SITE SEWAGE SYSTEMS PROVIDE QUALITY TREATMENT COMPATIBLE WITH THE LANDSCAPE?

At-grade wastewater treatment systems are currently approved for use in Alberta. However, recent research indicates that full sewage treatment does not always occur. This External Research study will examine 2-3 installed systems and assess the performance efficiency of an altered distribution pattern. Parameters to be measured include moisture content, bacterial counts, and nutrient content changes in the soil layer to which effluent has been applied. The final report is due in December 2009.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 28920209
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY INTENSITY OF CANADIAN WATER SYSTEMS

CMHC in partnership with NRCan, Greater Vancouver Regional District, and B.C. Hydro, is leading a multi-stakeholder study to determine the energy intensity of water systems in Canadian urban centres. The objective of the research is to quantify the amount of energy used within water and wastewater systems and the potential energy impact of water conservation. Energy intensity profiles will include extraction and conveyance of water imported from outside a local watershed; extraction of local surface and groundwater sources; treatment and distribution of potable supplies; and, wastewater collection, treatment, and discharge. Total energy inputs are region specific as they are dictated by factors such as: water quality and availability, climate patterns, settlement patterns, level of treatment, treatment processes used, topography, distribution pumping and pressurization requirements, etc. In order to allow for comparison between study areas, an attempt will be made to develop a meaningful method to normalize water related energy use. Potential performance indices include energy use per capita, per hectare served, per fixture served, etc. This work will provide an opportunity to evaluate the methodology used in the project, the availability of the required inputs, the usefulness of the output derived and the potential applicability to other jurisdictions. Preliminary work undertaken in Vancouver will be complemented by further work in another municipality (to be determined) in order to provide a comparison of system energy consumption. The project is expected to be completed by the fall of 2008.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 32290200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF ENZYMES OR BACTERIAL ADDITIVES FOR THE REHABILITATION OF FAILED LEACHING BED SYSTEMS

The proposed research aims to determine the viability of using biological septic system additives (enzymes and/or bacterial cultures) to rehabilitate leaching beds experiencing trench failure. In addition, the data collected during the execution of the proposed study will also assist in developing an application methodology for homeowners, if appropriate. Project completion and final report submission is scheduled for March 2008.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 34380207
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF EXPERIMENTAL ONSITE WASTEWATER SYSTEMS IN HEAVY CLAY SOILS AND COLD CLIMATES

This project will assess the performance of shallow/at-grade experimental onsite wastewater treatment systems in heavy clays and in cold climates. Parameters to be assessed will include: biofilm characteristics and treatment performance textile filters, hydraulic performance of soil systems, and temperature impacts. A final report is due December 2008.

CMHC Project Officer : *Catherine Soroczan* ***CIDN*** : 28370215
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF WATER CONSERVATION PRACTICES

This research will provide municipalities with guidance in creating a cost effective water efficiency plan (WEP). The use of a standardized WEP will allow for practical and useful comparisons between water efficiency programs implemented across Canada. A template WEP will be developed to incorporate the variety of necessary parameters to be considered such as water source, population size and growth, regional socio-economic, climatic and geographic conditions, infrastructure status, target changes in water demands and wastewater flows, projected capital works and related costs, and cost/benefit. The WEP template will include a software database for creating a water efficiency plan plus a report documenting the key components of water efficient planning. The final report is anticipated to be published by December 2008.

CMHC Project Officer : *Catherine Soroczan* ***CIDN*** : 30550200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

INNOVATIVE RESIDENTIAL STORMWATER MANAGEMENT FOR SUSTAINABLE HOUSING AND COMMUNITIES

CMHC is supporting the development of strategies, policies, case studies and tools to support innovative residential stormwater management in Canada. This multi-party partnership includes the Canadian Water Network, Environment Canada, and various academic institutions and municipalities across Canada. Information developed by this project will be available through CMHC research reports and studies. To date workshops in Vancouver and Calgary have been held, attracting participants from government, academia, community groups, developers and consultants. Presentations from these workshops are available at http://www.ires.ubc.ca/projects/ism. A third workshop will be taking place May 7th and 8th, 2008 in Toronto.

CMHC Project Officer : *Catherine Soroczan* ***CIDN*** : 36420200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RAINWATER HARVESTING - DEMONSTRATIONS

CMHC is supporting innovative projects with the Cities of Toronto and Guelph to advance rainwater harvesting technologies and strategies in the Canadian residential sector. A rainwater harvesting system for toilets and irrigation will be incorporated and monitored in a high-rise multi-unit residential building in downtown Toronto. A multi-goal project with the University of Guelph will serve to pilot rainwater harvesting applications for indoor and outdoor residential use while addressing technical and regulatory issues related to design, certification, approvals and performance. Information from Canadian and international examples regarding code issues, plumbing issues, technology design and performance issues will be adapted. The Cities of Toronto and Guelph will support the projects by working to remove any municipal obstacles that may preclude this work. Results from this work will be used to promote and increase awareness regarding the feasibility of rainwater harvesting for onsite reuse particularly for large scale residential developments. The project will be completed by November 2008.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 33190200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SLOPING SAND FILTERS FOR ON-SITE WASTEWATER TREATMENT

The overall objective of this External Research Project Grant is to develop and test design guidelines for Sloping Sand Filter (SSF) systems which maximize treatment performance while minimizing construction costs. The hydraulic characteristics and treatment performance of SSFs operated at different loading rates will be assessed within this study. These field studies will supply the data needed to calibrate and test a SSF hydraulic model. The model, once tested, will be used to develop and refine design guidelines for SSF systems. Project completion and submission of the final report are scheduled for August 2008.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 34380205
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SMALL COMMUNITY WASTEWATER TREATMENT OPTIONS

Wastewater servicing is an issue of increasing importance to society, in particular small communities across Canada. Typically communities with wastewater problems are given two options, on-site wastewater treatment or centralized sewer systems. The Ottawa Septic System Office (OSSO) believes that small communities do not have access to enough unbiased information when making servicing decisions. The OSSO will identify several wastewater options for communities with an average daily wastewater flow of < 50,000 L/d . The proposed research will focus on wastewater treatment options utilizing subsurface disposal. The research will examine multiple wastewater servicing options and solutions to associated problems. Efforts will be concentrated on existing approved technologies as well as innovative and emerging technologies. Work is currently underway to analyse data gathered from a literature review and a survey to municipalities on onsite wastewater issues.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 36260204
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SUPPORT FOR NATIONAL ONSITE WASTEWATER RESEARCH PROGRAM

CMHC in conjunction with the Canadian Water and Wastewater Association and the provincial onsite associations of Ontario, Alberta, and B.C. will work with national stakeholders across the country to address research and policy gaps in the area of decentralized wastewater management. The network will identify and prioritize all research and policy issues, and leverage funding to address these issues and communicate the results across the country. As a starting point, CMHC will support targeted research for the development of onsite wastewater technology verification and installation standards. To date CMHC has supported the Bureau du normalisation du Québec in the development of a national standard for onsite wastewater technology verification. Three committee meetings have taken place and the draft national standard is now out for a public review period ending April 14th, 2008.

A second initiative is support for the development of a national onsite wastewater installation standard through the Canadian Standards Association. Two meetings have taken place and a finalized standard is anticipated in 2011.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 35720200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SUPPORT FOR THE CREATION OF A NATIONAL WATER REUSE PROGRAM

CMHC will work with stakeholders from various government levels, associations, private industry and research centres to establish a Canadian national residential water reuse research and development program of work. This program will address gaps including: policy needs, risk analysis, design standards, pricing strategies, technology performance criteria, enhanced pilot testing and technology demonstration, national guidelines and regulations and innovative technology support for export to developed markets. The first project under this program has been the development of a draft national water reuse guideline for toilet application. The final draft was posted for public enquiry in January 2008 and comments are now being incorporated into the final version. The guideline is anticipated to be finalized and available for summer 2008.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 35730200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

See also: SEVEN GENERATIONS. WATER CONSERVATION AND SAFETY, p. 59

MODELLING AND ASSESSING LOWER RAINWATER RUN-OFF IN STRATFORD, ON, p. 83

STORMWATER MANAGEMENT CASE STUDIES, p. 84

SOCIO ECONOMIC RESEARCH

ABORIGINAL HOUSEHOLD, HOUSING AND COMMUNITY CONDITIONS BASED ON THE ABORIGINAL PEOPLE'S SURVEY (APS)

The consultant hired for this project has completed consultations with stakeholders both internal and external to CMHC, including all National Aboriginal Organizations (NAOs). He is now using the consultation results to identify and develop an analysis plan and an assessment of data requirements in preparation for the analysis of custom data linking Statistics Canada's post-censal Aboriginal People's Survey (APS) to CMHC's custom 2001 Census-based housing conditions indicators. The development of data specifications and the research issues to be analysed is being done through consultations between the consultant, CMHC staff, DIAND, and the NAOs. Based on these specifications, Statistics Canada will produce the custom data, which will be analysed and applied to the research issues (using the analysis plan developed through the consultation process). The 2001 APS is the single most comprehensive source of information on household, housing and community conditions faced by Canada's Aboriginal Peoples. The APS has been linked to CMHC's 2001 Census-based core housing needs indicators and the combined data are beginning to be acquired for analysis to profile the housing and community challenges facing each of Canada's Aboriginal peoples. As the research is completed, research findings will be published via research reports/highlights and at the end it is planned that an electronic data base specific to Aboriginal housing conditions will be developed and released.

CMHC Project Officer : *Ian Melzer* — ***CIDN*** : 35760200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

CASE STUDIES OF THE CRITICAL PRECONDITIONS FOR ACHIEVING MARKET-BASED APPROACHES TO HOUSING IN FIRST NATION COMMUNITIES

This project consists of at least 8 case studies of First Nation communities that have an established housing system with market characteristics. The studies will identify for each community the necessary and sufficient condition that enabled the market-like system to be implemented or to evolve. The findings from each community will be compared with each other to highlight commonalities and unique solutions and will also be compared with documentation of homeownership initiatives on tribal trust lands in the US.

CMHC Project Officer : *Michel Blondin* — ***CIDN*** : 36800200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

ESTABLISHING EFFECTIVE HOUSING MARKETS IN FIRST NATION COMMUNITIES

Based on recommendations of Regional staff and on consultations and/or focus groups with First Nations, and using the information (best practice/critical success factors) obtained in the Part IX Home Ownership Implementation Strategy, the project will identify a number of First Nation communities that are desirous of and willing to introduce a home ownership product in their community. It will investigate whether the availability of a homeownership option in the community will contribute to resolving the housing problems in the community. This could include First Nations wishing to use the Loan Insurance Pilot product. The project consultant will recommend a number of First Nations to be part of this project, and will layout a proposed implementation plan based on the individual First Nations chosen. They will work with the community to identify any shortfalls in understanding, knowledge, skill, policy and process, and will provide tools, direction, training, capacity development, guidance, and solutions to the identified problems. The project will document the process followed, highlighting the pitfalls, obstacles to success and opportunities for improvement for First Nations wishing to implement their own program. It will include establishment of a tool kit of resources needed to introduce and implement home ownership programs including such things as:

i) introducing the home ownership concept to the community;
ii) determining demand for home ownership; and
iii) establishing housing management systems.

The results of the project will be highlighted and communicated to client groups via a Research Highlight; a highlight which First Nation communities can refer to in the development of their own program, specifically the pursuit of a functioning housing market via homeownership on reserves.

CMHC Project Officer : *Kathy Hague* — ***CIDN*** : 32831500
Division : Assisted Housing Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ESTABLISHMENT OF ON-RESERVE HOUSING AUTHORITIES

The research project will investigate and document the critical success factors associated with housing authorities or similar structures. This will aid First Nation communities in their quest for more efficient and effective housing system management. The report will identify issues, challenges and success factors. A number of potential housing management models will be reviewed to guide First Nations in the establishment of housing institutions, including housing authorities.

CMHC Project Officer : *Line Gullison* — ***CIDN*** : 31841500
Division : Assisted Housing Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FEASIBILITY OF COMMUNITY RISK MANAGEMENT AS A SUBJECT FOR CAPACITY BUILDING IN ABORIGINAL COMMUNITIES

The objective of this project is to ascertain what are the components of risk management that are relevant in an Aboriginal community context, and to assess these against pragmatic criteria (as to whether the components can be taught in a capacity development environment and carried out by an Aboriginal community). The following tasks are envisaged: to review text and existing course materials; to determine what materials are relevant; to carry out interviews with risk management professionals and institutes, practitioners, CMHC, Indian and Northern Affairs Canada and other capacity development personnel & Aboriginal groups; to do analysis; and to make recommendations for course content and training methods.

Note: No. 08-006 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65590)

CMHC Project Officer : *Ed Nera* — ***CIDN*** : 24280200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Research Highlight is available

A FIRST NATION GOVERNANCE TOOL: FINANCING HOMEOWNERSHIP THROUGH REVOLVING LOAN FUNDS

This research will examine more closely how some of the barriers to financing for homeownership on reserve may be overcome through instruments that are owned and controlled by First Nations. Based on a comprehensive survey of communities that have implemented a Revolving Loan Fund (RLF), this project aims to:
1) perform a broad scanning of First Nation communities in order to document the extent to which communities have developed their own financing techniques, with a focus on RLFs;
2) investigate and document the operational requirements and costs of the Band administration to support the RLFs;
3) identify possible ways to improve the capacity of existing RLFs to offer low-cost loans for homeownership access, and to leverage financing from private lenders;
4) create a critical path leading to the implementation of a RLF on reserve; and
5) based on research findings, provide recommendations from a policy and program perspective to the Government of Canada, First Nations, and stakeholders in the housing finance industry.

The resulting research findings will be offered for presentation and discussion at national and/or regional meetings of Chiefs, and other fora as appropriate.

CMHC Project Officer : *John W Black* **CIDN** : 36820200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

GUIDE TO CITY HOUSING FOR ABORIGINAL PEOPLE

This product will provide Aboriginal people with practical information concerning how to obtain housing in urban centres. The publication will be a guide for those relocating from small rural and remote communities and also for those in urban centres who need further information concerning housing and homeownership.

CMHC Project Officer : *Ian Melzer* **CIDN** : 34130200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOW ECONOMIC DEVELOPMENT OPPORTUNITIES CAN BE LINKED TO HOUSING IN FIRST NATION COMMUNITIES

The research will explore how economic development opportunities can be linked to housing in First Nation communities. The research will include five case studies to examine successful approaches implemented and lessons learned by First Nation communities in linking economic development opportunities to housing on reserve. The research will make recommendations on approaches to foster linkages between economic development and housing that is appropriate to First Nation communities. The research will also identify research challenges and suggestions for future research based on past and current research findings. The final report, expected in early 2009, will be of interest to First Nation communities, and federal program and policy officials.

CMHC Project Officer : *Janet Neves* **CIDN** : 36840200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

IMPACT ON HOUSING OF THIRD PARTY MANAGEMENT IN FIRST NATIONS COMMUNITIES

The objective of this research is to inform policy and product development to facilitate housing solutions in First Nation communities that are operating under third party management. The research will examine federal policies and products as they relate to third party management of First Nations and their application across the country; and will carry out interviews to identify housing implications of third party management and possible solutions. The final report, expected in early 2009, will be of interest to federal policy and program officials, and First Nation communities.

CMHC Project Officer : *Janet Neves*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 36880200
STATUS : Ongoing
NEW

NEIGHBOURHOOD EFFECTS AND LEVELS OF CONCENTRATION FOR ABORIGINAL PEOPLE IN LARGE CITIES IN CANADA

While concerns with the effects of neighbourhoods on life chances have a long history in academic debates, there is no work that specifically considers neighbourhood effects on Aboriginal individuals of living in Aboriginal neighbourhoods in Canadian cities. This paper attempts to provide such a study by investigating the housing patterns of urban Aboriginal people and their relation with socio-economic outcomes, either positive or negative. Housing settlement patterns in the major urban areas of Canada with substantial Aboriginal populations are described statistically, using established indices for spatial distributions of population (evenness, clustering, concentration, centrality and exposure) at different levels of geographic aggregation. The statistics are discussed in terms of the pros and cons of the indices and geographies for each urban centre. The statistics are analysed with a selection of socio-economic census variables chosen for their potential relevance to social and economic outcomes based on research literature.

Prepared by Evelyn J. Peters, Department of Geography, University of Saskatchewan and Oksana Starchenko, Department of Government Relations, Government of Saskatchewan. CMHC Project Manager: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2008. 75 pages (5867 KB)

Note: No. 08-010 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65674)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Neighbourhood_Effects_and%20Level(W).pdf

PROJECTING ABORIGINAL HOUSING DEFICIENCIES

The proposal is in three parts. One is to use 2001 census data, supplemented by program administration data, to calculate the housing deficiency for the Aboriginal population. The deficiency is based on CMHC's established housing need measures, but measures both the incidence and depth of need, for on- and off-reserve. Through integration of census with program data on-reserve, the deficiency can be translated into a dollar value, giving an estimate of the cost of "correcting" the Aboriginal housing problem. In the other parts, the Aboriginal population is divided into on-reserve and off-reserve respectively and projected over 20 years, using an up-to-date model that incorporates shifts of identity and geography within the overall class of 'Aboriginal'. On reserve where the main issue is inadequate rate of housing supply, current trends in housing stock construction and losses and rates of repair and disrepair will be calculated and superimposed on the household projections to indicate gains or losses in the size of the housing deficiency. Off reserve where the main issue is low incomes, projection is limited to population and household estimates by the four

Aboriginal groups, no attempt being made to project the size of the housing deficiency, which would involve forecasting economic and housing market conditions. Instead, off reserve, two separate research ideas will be pursued - calculating income elasticity of demand for Aboriginal homeownership, and investigating the relationship of residential mobility to resolution of housing needs. Projections of the Aboriginal population, households, and families have been completed. Overviews of these projections are being published by Indian and Northern Affairs Canada, who are jointly funding and partnering this initiative.

CMHC Project Officer : *Ian Melzer*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 29890200
STATUS : Ongoing

SEVEN GENERATIONS. WATER CONSERVATION AND SAFETY. A HOUSING MANAGER'S GUIDE.

This research will consist of three components: examining and documenting the types of water problems that are encountered in 10 First Nation communities and their impacts on housing; proposing solutions to alleviate these problems and impacts; and production of a user-friendly plain language guide to water management and safety for housing managers in First Nations communities.

CMHC Project Officer : *Ian Melzer*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30230200
STATUS : Ongoing

SMALL FOOTPRINTS ON UNBROKEN LAND / HEALING BROKEN LAND

The project will contribute professional advice and services towards a new First Nation development project located on wild unbroken land in coastal BC and / or on previously used industrial or agricultural broken land. Starting with planning workshops and the development of a community plan, then moving towards establishing a renewable energy platform based on a business plan that establishes a continuous revenue stream, a sustainable development strategy and design solution will be produced for housing construction under Section 95 funding and other recently announced programs to produce 150± homes over 5 years. This will be combined with infrastructure funding from Indian and Northern Affairs Canada, Western Economic Diversification Canada, Natural Resources Canada and Human Resources and Social Development Canada. This project will produce a practical demonstration of sustainable planning, design and development models for rural and remote communities elsewhere in Canada. Fully planned and developed communities, complete with renewable energy systems, road, water, waste water and other essential infrastructure, will occur in several First Nation locations. Development models will be produced that encourage incorporation of sustainability principles and that are built upon economic development and capacity building. The ultimate outcome is 100-150 new homes built by community members in a community planned by the community through workshops and design charrettes.

CMHC Project Officer : *Allan Dobie*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 35290200
STATUS : Ongoing

ABORIGINAL HOUSING

SUPPORTING ABORIGINALLY MANAGED HOUSING OFF-RESERVE

This project is a comparative analysis of the government's approach in New Zealand, Australia and Canada in responding to the housing needs of their indigenous populations, and their urbanization.

CMHC Project Officer : *Ian Melzer*
CIDN : 30070200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SUSTAINABLE HOUSING IN THE NORTH

The objective of this research is to produce a user-friendly plain language research report that provides a background of "northern" (North of 60) housing in Canada, identifies the types of challenges encountered in northern housing in Aboriginal (Inuit, First Nations, Métis) communities and provides best practice examples of sustainable housing (durable, affordable in construction through use of local materials when possible and in maintenance through provision of energy, water and waste water management at a manageable cost) and sustainable housing components that have proven to be successful in Canada, and in northern countries that have geographic, climatic and resource challenges similar to those in northern Canada and which may be used, or adapted for use, in Canada.

CMHC Project Officer : *William Semple*
CIDN : 32740200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

USE OF DESIGNATED LAND ON-RESERVE FOR AFFORDABLE HOUSING

This research project will investigate and document the issues, impediments and opportunities in using designated land to facilitate affordable housing on-reserve and will communicate the results to First Nation communities and other stakeholders involved in housing on-reserve.

CMHC Project Officer : *Kathy Hague*
CIDN : 31691500
Division : Assisted Housing Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

See also: RETROFITTING CRAWL SPACES - FIRST NATIONS DEMONSTRATION, p. 10

CHILDREN S ENVIRONMENTS

HOUSING, NEIGHBOURHOODS AND CANADIAN CHILDREN'S HEALTH OUTCOMES

This External Research Project will use Cycles 1 to 5 of the National Longitudinal Survey of Children and Youth (NLSCY) to examine whether and how much a family's housing choices (owned home, unassisted rental, assisted housing; single family, row housing, etc.) affect child health outcomes. The research will seek to identify which housing and neighbourhood characteristics associated with home ownership, rental, assisted housing and/or type of housing have impacts on health outcomes, and which do not, and how these characteristics interact with housing choices to affect child health outcomes.

CMHC Project Officer : *Fanis Grammenos*
CIDN : 36260205
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

2007-2008 FUNDING FOR THE INTERGOVERNMENTAL COMMITTEE ON URBAN AND REGIONAL RESEARCH (ICURR)

CMHC's contribution to ICURR for 2007-2008. ICURR's mandate is to contribute, through consultation, to the effectiveness of the urban and regional research activities of all levels of government in Canada, by facilitating the exchange of information about such activities.

CMHC Project Officer : *Mark Holzman*
CIDN : 28940200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : There will be no product for this project

ASSISTING MUNICIPALITIES AND DEVELOPERS IN IMPLEMENTING THE FUSED GRID PLANNING MODEL

This study aims at generating a planning policy document that will guide the growth of East Gwillimbury. The intent is to examine how the Fused Grid planning model can meet the Town's objectives for sustainable growth. Options for growth will be examined with the intent of setting LEED-ND standards for all development in the town. In this context, the Fused Grid will be analyzed and compared to other site planning options in order to assess its potential for meeting sustainability targets. The result will be a policy document that provides substantiated options for accommodating growth in East Gwillimbury.

CMHC Project Officer : *Fanis Grammenos*
CIDN : 35170200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

COMPARING CANADIAN NEW-URBANIST AND CONVENTIONAL SUBURBAN NEIGHBOURHOODS

This study will gather and compare data from new-urbanist developments and conventional suburban developments to determine if key objectives of these developments have been realized. Variables to be examined include: car usage for weekday urban travel; access to daily destinations; pedestrian connectivity; housing choice; compactness; occupant satisfaction (e.g. pedestrian safety, aesthetic qualities); access to useful public open/green space; and interaction. The study will derive lessons learned about various neighbourhood design features and how well they achieve key objectives. Four new-urbanist developments and four comparable conventional suburban developments have been chosen and surveyed, and an interim report has been submitted and reviewed. Data analysis is complete and the draft final report has been submitted and reviewed and the final report will be completed this summer.

CMHC Project Officer : *Lynn Armstrong*
CIDN : 30610200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CONTAMINATED LANDS

NATIONAL REVIEW - ENVIRONMENTAL REGULATORY SCAN FOR CONTAMINATED LANDS

The purpose of this project is to outline the pertinent regulatory requirements related to brownfield redevelopment for housing in Canada, including but not limited to multi-unit, rental residential projects. An inventory of regulatory requirements will be prepared and the regulatory requirements will be compared across jurisdictions. Recent and anticipated changes to the requirements will be identified. Content for informational resources will be developed, to assist those pursuing or involved in brownfield redevelopment for housing. The research will provide those involved in brownfield redevelopment for housing with information regarding the relevant regulatory requirements in each jurisdiction and any upcoming or proposed regulatory changes.

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 36190200
STATUS : Ongoing

OVERCOMING BARRIERS TO BROWNFIELD REDEVELOPMENT

This project provided support to the Canadian Brownfield Network, aboutRemediation.com and the Ontario Centre for Environmental Technology Advancement (OCETA), for activities that encouraged and built the capacity of key stakeholders for brownfield redevelopment. The project included support for brownfield knowledge workshops which were held across Canada and support to the aboutREMEDIATION.com website.

STATUS : Completed
AVAILABILITY : There will be no product for this project

COOPERATIVE AND NON-PROFIT HOUSING

SUSTAINING THE NON-PROFIT SECTOR IN BRITISH COLUMBIA, PHASE II

The Sustaining the Non-Profit Housing Sector in B.C., Phase II project will provide a range of workable solutions to the concerns identified by non-profit housing providers in Phase I of the study and which have to do with:
i) expanding the sharing of services/resources and extending bulk purchase opportunities;
ii) attracting, training and managing volunteers more effectively; and
iii) increasing the scale and professionalism of fund raising.
The goal of this project is to develop options which effectively address each of the problem areas and are flexible enough to appeal to housing societies with a broad range of management styles, geographic locations and operational priorities.

CMHC Project Officer : *Stephen G Hall*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 34240200
STATUS : Ongoing

COOPERATIVE AND NON-PROFIT HOUSING

UPDATING THE CMHC ON-LINE GUIDE TO COOPERATIVE HOUSING

The purpose of this project is to update the Cooperative Housing Guide, including both substantive content and reference information such as website links.

CMHC Project Officer : *Ian Melzer* ***CIDN*** : 32630200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

HOUSING

EXAMINATION OF THE BOUNDARIES BETWEEN HOUSING AND INCOME SECURITY POLICY

The result of this study will increase awareness of the importance of housing in respect to broader social policy and income support policy in particular. This will contribute to the work of the Federal-Provincial-Territorial working group on affordable market housing, and potentially to other exercises such as the development of a market basket for measuring poverty and the design of future income support policy (e.g. National Child Benefit). This study will compare the housing and income support systems in four countries (Canada, United States, United Kingdom and Australia). It will focus on the structure of housing.

CMHC Project Officer : *Brian Davidson* ***CIDN*** : 30140200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

FAMILY WELL-BEING, COMMUNITIES AND HOUSING

This External Research Program project will examine family housing need, family well-being and the municipal response. Through this research it will be possible to get a better sense of the extent to which policies related to housing and family well-being are "on the radar" of local governments and to identify the range of strategies and initiatives that municipal governments have put in place to respond.

CMHC Project Officer : *Brian Davidson* ***CIDN*** : 36260212

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

VIRTUAL SHOWCASE OF HOUSING IN CANADA

This project will assess the viability and options for the creation of a virtual showcase of exemplary housing projects in Canada. This showcase is expected to provide a forum to post leading edge projects which meet preset criteria for innovation and quality in a format that facilitates easy comparison.

CMHC Project Officer : *Douglas B Pollard* ***CIDN*** : 36500200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ****NEW****

AFFORDABLE HOUSING FOR FAMILIES: ASSESSING THE OUTCOMES

Families who cannot access affordable housing not only face increased housing pressure, but also many other social and economic problems, and risk homelessness. Yet there are currently no new programs in BC for affordable housing for families. This External Research Program project aims to produce important information on outcomes for families in affordable housing for input to policy-making.

CMHC Project Officer : *Ed Nera* | ***CIDN*** : 34380214

Division : External Research Program | ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

AFFORDABLE HOUSING INITIATIVE EVALUATION PLAN

The Affordable Housing Initiative (AHI) was announced in 2001 as a collaborative initiative between the federal and the provincial and territorial governments. The Initiative was implemented under The Framework for Bilateral Agreements Aimed at Affordable Housing (November, 2001). This is a multilateral framework agreed to by federal, provincial and territorial housing ministers that sets out the parameters of bilateral F/P and F/T Affordable Housing Program Agreements (AHPAs). Under these agreements, the provinces and territories determine priorities for funding and design and deliver the programs within agreed parameters.

The federal government has allocated $1 billion in funding for the AHI, and provincial and territorial housing agencies and other contributors are expected to bring total expenditures to at least $2 billion.

The accountability frameworks attached to the bilateral Affordable Housing Program Agreements stated that CMHC is responsible for leading a Canada-wide evaluation of the AHI, and that the provinces and territories will be invited to participate in the design and conduct of the evaluation. In Quebec, the SHQ will evaluate its affordable housing activities and provide related information to CMHC for the Canada-wide evaluation report.

The two key purposes for this evaluation are
1) to report on the relevance, success, and cost-effectiveness of the two phases of AHI expenditure and
2) to inform decisions about whether to continue or modify the initiative or to let it lapse.

The evaluation plan provides a description of the AHI and its logic and outlines evaluation issues, data sources and analytical methods to be used. An evaluation timetable is included.

Ottawa: Audit and Evaluation Services, Canada Mortgage and Housing Corporation, 2008. 41 pages (1730 KB)

Disponible aussi en français sous le titre : Plan d'évaluation de l'initiative en matière de logement abordable

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Initiative_evaluation_plan(w)_jan08.pdf

AFFORDABLE HOUSING STUDY FOR THE CITY OF ST. JOHN'S

The City of St. John's, through its Planning and Housing Standing Committee, sponsored an Affordable Housing Study. An Advisory Committee, chaired by Councillor Shannie Duff, was established to oversee the study. The purpose of the study was to:

1. identify the current supply and scope of affordable housing in St. John's;
2. consider the changing demand for affordable housing based on demographic and other trends with forecasts of housing requirements;
3. comment on the capacity of the City and that of other stakeholders to respond to this demand;
4. define the role of the City and its responsibilities in the development and delivery of affordable housing along with that of other stakeholders; and
5. develop an Action Plan for Affordable Housing for the period to 2016.

This report and Action Plan for affordable housing in St. John's arises from the information collected during the study phase including the assessment of the existing portfolio as contained in the separate Background Report, interviews and consultations with clients and stakeholders, research and analysis. This report was undertaken in partnership with the City of St. John's, Service Canada, and CMHC.

Submitted by the Institute for the Advancement of Public Policy, Inc. in collaboration with Auspex Consulting, Inc. Submitted to: Planning and Housing Standing Committee, City of St. John's. CMHC Project Officer: Brian R. Martin. St. John's, Newfoundland and Labrador: Institute for the Advancement of Public Policy, Inc., 2007. 2 volumes

Volume 1: Project Report and Action Plan (2.24 MB)
Volume 2: Background Report: Affordable Housing Stock, Gaps, Trends, & Key Issues (904.52 KB)

STATUS : New Completed Report

AVAILABILITY :
http://www.stjohns.ca/cityhall/pdfs/Housing%20Study%20Project%20Report-20071125.pdf

Http://www.stjohns.ca/cityhall/pdfs/Housing%20Study%20Background%20Report-20070725.pdf

ANALYSIS OF HOUSING AFFORDABILITY, 1971-2001

This project will examine trends in housing affordability for owners and renters over the period 1971 – 2001 using micro data files from the Census of Canada and Statistics Canada household surveys.

CMHC Project Officer : *Jeremiah Prentice*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 34380202
STATUS : Ongoing

RECYCLING CATHOLIC CONVENTS AND RELIGIOUS INSTITUTIONAL BUILDINGS INTO AFFORDABLE AND ALTERNATIVE HOUSING: THREE CASE STUDIES

This project under the External Research Program will examine the recycling of religious institutional buildings in Quebec City into housing. An inventory of buildings that have been converted will be prepared and three case studies will be analyzed. Interviews will be conducted with the architects, municipal planners, occupants of the buildings and members of the religious order to assess the success of the housing project. Recommendations will be provided for future conversions of similar buildings. A draft final report has just been received for final review and approval.

CMHC Project Officer : *Lynn Armstrong*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 26470205
STATUS : Ongoing

ACCESS TO HOUSING FINANCE AMONG RECENT IMMIGRANTS

Demographic changes in Canada have placed new demands on the housing finance system. This project will provide an assessment of recent Canadian immigrants' access to housing finance by addressing the following questions: How do immigrants interact with and understand the mortgage market? Does such interaction differ geographically across the country? How are Canadian financial institutions adapting to the special circumstances of immigrant borrowers? What are the strategies that can be used to educate and evaluate recent immigrant mortgage applicants?

CMHC Project Officer : *Kamal C Gupta*
CIDN : 36630200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

BARRIERS AND OUTCOMES IN THE HOUSING SEARCH FOR NEW IMMIGRANTS AND REFUGEES: A CASE STUDY OF BLACK AFRICANS IN TORONTO'S RENTAL MARKET

While Toronto is Canada's traditional main "port of entry" for new immigrants as well as the country's largest and most culturally diverse city, it is also one of the most expensive housing markets in Canada. Studies have found that new immigrants to Canada are likely to face the greatest affordability problems in this housing market.

This study looked at three groups of Black, Portuguese-speaking immigrants and refugees – from the former Portuguese African colonies of Angola, Mozambique and the Cape Verde Islands – who arrived in Toronto between 1990 and 2006. The key questions in this study were: What barriers do these groups face in the private rental housing market? Does race or skin colour matter in looking for and locating rental housing in Toronto?

The two-part research strategy consisted of a literature review and a questionnaire survey that was administered in Toronto to immigrants and refugees who were born in Angola, Mozambique and Cape Verde Islands.

Prepared by Carlos Teixeira. Ottawa: Canada Mortgage and Housing Corporation, 2007. (External Research Program Research Report) 97 pages (904 KB)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Barriers_and_Outcomes_(W).pdf

BEST PRACTICES IN DEVELOPING CULTURALLY APPROPRIATE SUPPORTIVE HOUSING MODELS FOR PREVENTION AND TREATMENT OF MENTAL HEALTH / SUBSTANCE USE PROBLEMS

The goal of this project is to identify evidence-based best practices in developing culturally appropriate supportive housing models for persons from ethno-racial / ethnocultural communities with mental health and/or addiction issues and produce a housing development manual that can be used by groups wishing to develop supportive housing for these communities. This will be accomplished by conducting a literature review, reviewing existing housing models and consulting with various stakeholders in Toronto (consumers, families, funders, housing and service organizations) to identify critical issues that must be considered in designing and developing appropriate housing for the target group.

STATUS : Completed

AVAILABILITY : Centre for Addiction and Mental Health

HOUSING AND IMMIGRATION

HOUSING NEWCOMERS IN CANADA: AN ANALYSIS OF LSIC DATA (WAVE2)

The objective of this External Research Program project is to investigate the relationship between immigration and housing in Canada, using new data from the second wave of the Longitudinal Survey of Immigrants to Canada (collected two years after landing). How are immigrants coping in the Canadian housing market, particularly in Montréal, Toronto, and Vancouver? Are they able to find suitable housing? At what cost, relative to their financial resources? What impacts are immigrants having on these housing markets?

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 36260208
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

METROPOLIS PROJECT - PHASE 3

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues through a network of research centres in Canadian universities (Centres of Excellence). This project is a continuation of support to the Metropolis Project for Phase 3, fiscal year 2006/2007 to 2011/2012. The results of the research will be used for the assessment of and development of policies and programs affecting new Canadians. Products related to this project are or will be available on the Metropolis web site and/or the web sites of the Centres of Excellence, accessible through the Metropolis web site.

STATUS : Completed
AVAILABILITY : Product is available on the web

REVIEW OF CMHC'S NEWCOMER'S GUIDE TO HOUSING

This is a review with stakeholders to identify ways of increasing the usefulness and impact of CMHC's Newcomer's Guide to Housing.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 36900200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOUSING EXPORT OPPORTUNITIES

ACCEPTANCE OF CANADIAN SYSTEMS IN THE EUROPEAN UNION

The purpose of this project is to research market acceptance and regulatory approval of Canadian building products in European markets.

CMHC Project Officer : *Jorge Malisani* ***CIDN*** : 34520900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ASSESSMENT OF BRANDING AND CERTIFICATION PROCEDURES IN FRANCE

The study will produce an action plan for the recognition of Canadian construction technology in order to facilitate market access and exports of Canadian construction systems and products. This study will serve as a basis for discussions with Canadian partners in view of developing a shared vision and a strategy for the approval and promotion of Canadian technology and products in France. The study will not be made public until the discussions with the partners have been completed.

CMHC Project Officer : *Guy Lemieux*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 33440900
STATUS : Ongoing

BEST PRACTICE GUIDE FOR HOUSING EXPORTERS TO THE UNITED KINGDOM

This research project will produce a document to assist Canadian exporters of houses to the United Kingdom. It will explain legal issues, project process and management practices, and service expectations. A glossary will be included of common UK and Canadian building terms.

CMHC Project Officer : *André Asselin*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 33390900
STATUS : Ongoing

COMPETITIVE COST AND PERFORMANCE STUDY IN FRANCE

The purpose of this project is to conduct a study on building costs, energy consumption and acoustic properties comparing traditional French construction to Canadian wood-frame technology. The goal is to compare the R-2000/Super-E standards to standards used in France, including future standards like RT-2005/RT-2010, and to analyse total costs attached to the Canadian housing system compared with traditional construction and other wood construction available in France. The costs will include building costs, energy costs, transportation costs and other costs to arrive at a global perspective. If possible, comparisons with standards used in other French speaking countries will be added. The project outcome will be a study report and a specification sheet for a typical Canadian housing system to be used by CMHC and Canadian manufacturers.

CMHC Project Officer : *Guy Lemieux*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 37040900
STATUS : Ongoing

DEVELOPMENT OF CANADIAN LABELLING PROGRAM FOR CHILE

The Labelling program would provide foreign buyers with the assurance that the homes originated from Canada, were successfully certified, and were adequately installed on-site to ensure expected system performance. The program will also offer training and after sales service support. On the other hand, Canadian participant members would benefit from a differentiation from the local and foreign competitors, an increased credibility based on the compliance to an independent quality control process which maximizes Canadian housing recognition and reputation abroad, and a protected trade mark, etc.

CMHC Project Officer : *Guy Lemieux*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 28860900
STATUS : Ongoing

DISTRIBUTION AND BUILDER RESEARCH IN SELECTED U.S. MARKETS

The project will study distribution channels and builder buying preferences for specific products in some areas of the United States. The focus for this project will be Middle Atlantic and South Atlantic regions of the U.S. Other areas could also be included in the study. Distribution for the following products will be examined: insulation, solar panel, high-end roofing, and windows. Builder buying preferences will be studied for staircase and millwork. The project outcome will be market intelligence reports for specific building products and U.S. Regions.

CMHC Project Officer : *Sanjar Farzaneh*
CIDN : 37030900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

EXPORTING TO RUSSIA: LESSONS LEARNED FROM THE CANADIAN HOUSING INDUSTRY PROJECT

The objectives of this project are:

- to identify needs, challenges, and opportunities in the Russian housing market;
- to investigate the operational experience of Canadian housing exporters in Russia;
- to identify export barriers, business opportunities and the challenges facing Canadian housing exporters in Russia;
- to identify key success factors employed by Canadian housing exporters in Russia;
- to assess the comparability between the requirements of the Russian housing market and the capabilities of the Canadian housing industry; and
- to assess CMHC's past role in assisting the Canadian housing export industry to market effectively in Russia.

CMHC Project Officer : *Mietka Zieba*
CIDN : 28030900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

FEASIBILITY STUDY ON ONTARIO WOOD PRODUCTS EXPORT ASSOCIATION

This project consists of a feasibility study on the creation of an export association for wood products in Ontario. The results of the study will be disseminated among interested stakeholders.

CMHC Project Officer : *Sanjar Farzaneh*
CIDN : 36150900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet availab

FOLLOW-UP TO 2006 MARKET RESEARCH ON HARDWOOD FLOORING & ENGINEERED WOOD FLOORING IN THE UK

Based on a 2006 market study of hardwood and engineered wood flooring products to the United Kingdom, the purpose of this project is to conduct more focused research for Canadian companies on the commercial opportunities raised in the report based on their specific needs in order to increase their export sales.

CMHC Project Officer : *Terry Robinson*
CIDN : 36340900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

IDENTIFICATION AND DEVELOPMENT OF BUSINESS OPPORTUNITIES IN THE FRENCH MARKET: PREFABRICATED HOMES

The purpose of this project is to provide research on builders, developers and residential projects that could present business opportunities for Canadian manufacturers of prefabricated products. The results of the study will enable CMHC to better guide the industry toward the best business opportunities, in order to increase the Canadian presence on the French market. This document will be available on CMHC's web site. The project involves a second part that will be funded exclusively by Canadian companies interested in obtaining matchmaking services with French contractors.

CMHC Project Officer : *Guy Lemieux* — ***CIDN*** : 33430900
Division : CMHC International — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MARKET DEVELOPMENT IN FRANCE FOR THE CANADIAN HOUSING INDUSTRY

The project has two primary objectives: act as a local resource for CMHC to provide concrete assistance in view of achieving its development objectives on the French housing market, and identify and develop business opportunities and contacts in France for Canadian housing systems and components manufacturers in general.

CMHC Project Officer : *Guy Lemieux* — ***CIDN*** : 37080900
Division : CMHC International — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MARKET OPPORTUNITIES WITH MEXICAN HIGH-END BUILDERS

The project will provide information on housing projects and their contacts in different Mexican cities. It will also identity opportunities in the Mexican distribution channels for high-end products. Project outcome: Market intelligence reports, greater integration of Canadian products/systems in the high-end segment.

CMHC Project Officer : Paulina Barnes — ***CIDN*** : 37090900
Division : CMHC International — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ****NEW****

MEXICO RESEARCH ON MARKET INTELLIGENCE AND OPPORTUNITIES FOR BUILDING PRODUCTS

The project will describe and assess the distribution channels in Mexico for selected building products and identify potential Mexican buyers. For each selected building product, a summary report on market opportunities and distribution channels, key contacts in the distribution channels and other contacts will be produced. The report is intended for Canadian building product manufacturers interested in the Mexican market.

CMHC Project Officer : *Paulina Barnes* — ***CIDN*** : 33460900
Division : CMHC International — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

OVERVIEW OF CANADIAN EXPORT POTENTIAL IN THE RESIDENTIAL HIGH-RISE SECTOR

The study will provide an overview of Canadian strengths in the residential high-rise sector and report on areas where Canadian companies have a technological or an expertise advantage in foreign markets.

CMHC Project Officer : *Guy Lemieux*
CIDN : 36270900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

RESEARCH BUSINESS OPPORTUNITIES IN CHINA

This project will consist of identifying and documenting business opportunities in China and matching them with Canadian manufacturers. This project will also be funded by Canadian manufacturers participating in the program. A report will be produced on the results of the program

CMHC Project Officer : *Tulio Conejeros*
CIDN : 37070900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

RESEARCH ON CANADIAN GREEN BUILDING PRODUCT CAPABILITIES

This project will develop an inventory of Canadian green building products for promotion in the USA market.

CMHC Project Officer : *André Asselin*
CIDN : 33920900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

RESEARCH ON EMERGING MARKETS

The purpose of this project is to report on emerging markets in the Gulf Cooperation Council, Middle East that offer potential export opportunities for Canadian product manufacturers and service providers.

CMHC Project Officer : *Brian Eames*
CIDN : 37060900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available
****NEW****

RESIDENTIAL GREEN BUILDING INDUSTRY IN THE U.S.A. AND OPPORTUNITIES FOR CANADIAN MANUFACTURERS

The Canadian industry requires better intelligence on the green building movement in the USA to assist in making export business decisions. The research provides a description of the main factors driving the construction of green buildings, criteria for defining green products and buildings, identification of the main organizations involved in this area, explanation of the major programs and product rating systems, and recommendations on how best to take advantage of this rapidly growing area of the construction industry in the USA.

Ottawa: CMHC International, c2007. 37 pages (1.38 MB)

Nota : Disponible aussi en français sous le titre: Secteur de la construction résidentielle écologique aux États-Unis et occasions d'affaires pour les fabricants canadiens

STATUS : New Completed Report

AVAILABILITY : CMHC International and
http://www.cmhc-schl.gc.ca/en/hoficlincl/cmhcin/suexin/inma/upload/Green_Report_EN.pdf

ROADMAP TO PRODUCT APPROVALS IN RUSSIA

The study will address the following issues and information needs: the degree to which certification is mandatory, relationships between product certification and building products, alternate routes for local and national approvals, the respective roles of competing Russian agencies and jurisdictions, identification of key contacts within these agencies, the acceptability of Canadian standards and test data. For the specific product categories to be studied in detail, additional information will be collected on technical requirements, relevant Russian or international standards, etc.

CMHC Project Officer : *Mietka Zieba*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 28880900
STATUS : Ongoing

STUDY ON DISTRIBUTION CHANNELS AND CONSTRUCTION PROJECTS IN MEXICO

This project will describe the distribution channels in Mexico for selected building products, and will identify market opportunities among high-end builders and construction projects.

CMHC Project Officer : *Paulina Barnes*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 34720900
STATUS : Ongoing

STUDY TO IDENTIFY THE CHANGES HAPPENING TO THE JAPANESE BUILDING REGULATIONS AND THEIR IMPACT ON CANADIAN INDUSTRY ACTIVE IN JAPAN

A document will be produced in English to be distributed to Canadian housing suppliers of products and systems. The document will outline a path by which the Canadian housing industry can follow to meet current changes happening in the regulatory environment which will assist sustaining and expanding market share. The document will provide an overview of legislation and regulations that guide the building industry in Japan; describe type approvals and product specific approvals and what they mean and in which cases they can be used; describe the various testing and approval facilities, etc.

HOUSING EXPORT OPPORTUNITIES

CMHC Project Officer : *Laura Diakiw*	***CIDN*** : 27380906
Division : CMHC International	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SURVEY OF US AND CANADIAN MODULAR BUILDERS DOING BUSINESS IN MAINE

The survey will aim at uncovering the elements which presently foster a negative view of Canadian modular builders in Maine and the work they conduct under the guise of delivering a manufactured home to the intended site. The result of the study is intended for both the Maine Modular Builders Association and CMHC International.

CMHC Project Officer : Ronald Drisdelle	***CIDN*** : 34370900
Division : CMHC International	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

HOUSING FINANCE

ISLAMIC AND OTHER FAITH-BASED HOUSING FINANCE NEEDS

The key objective of this project is to understand Sharia mortgage lending. The project will include a review of recent literature and a comprehensive review of a range of different data and information sources, including academic publications, research reports, government publications, and interviews with Canadian key players. This study is divided into the following phases: (1) What is Sharia mortgage lending? (2) How is Sharia being applied to mortgage lending in various countries? (3) What are the potential legal, regulatory and taxation/accounting impacts of implementing Sharia mortgage lending in Canada?

CMHC Project Officer : *Bruno Duhamel*	***CIDN*** : 36680200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	****NEW****

UPDATE 2002 LEVIES, FEES, CHARGES AND TAXES ON NEW HOUSING

This study is the third in a series on Government Imposed Costs (GICs) on new housing, preceded by the 1996 and 2002 studies. It covers most major urban centers (32) and tabulates the entire range of GICs and the share of each component of the total burden. Like the 2002 study it continues the tracing of trends in GICs. In addition to tabulating the current level of GICs and analyzing their trends, the project reviews and critiques the methodologies employed in earlier studies and reports on their relative merits. The study also attempts to quantify the separate and cumulative impact of government-imposed costs on the affordability of new homeownership and rental dwellings in Canada.

CMHC Project Officer : *Steven Ehrlich*	***CIDN*** : 34040200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

CANADIAN HOUSING OBSERVATORY - 2008

The Canadian Housing Observer, is a flagship CMHC publication which provides comprehensive and authoritative reporting on the state of Canada' s housing. The Observer is published annually and is available in print and electronic formats. The analysis presented in the Observer, coupled with the extensive on-line data resources, provides Canada's housing sector with an indispensable tool for identifying, monitoring and addressing housing trends and issues. It is an ideal resource for housing planners and policy makers; housing researchers, educators and students; home builders; housing finance and real estate professionals; and municipal, provincial, and federal housing specialists.

CMHC Project Officer : *Sandra Baynes*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 37380200
STATUS : Ongoing

IMPACT OF BUSINESS CYCLES ON CORE HOUSING NEED

This project will provide policy makers and researchers with an understanding of the impact of various changes in economic conditions on housing need. This project will also help policy makers understand the potential cyclical aspects of housing need, and understand, for example, how policy responses to an increase in housing need caused by a temporary surge in unemployment is different from an increase in housing need caused by persistent increases in housing and related costs, such as interest rates, utility rates and property taxes. This project will therefore decompose changes in housing need into portions attributable to cyclical factors and those attributable to structural considerations.

CMHC Project Officer : *Pamphile Codo*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 35010200
STATUS : Ongoing

SPATIALITY OF HOUSING PRICE RISKS

This External Research Program study is intended to examine the spatiality of housing price risks, price risks being defined as price fluctuations over time. Its objectives are to describe the spatial pattern of price risks and test the main hypothesis that price risks are correlated with the residential built environment. The study will also identify the socioeconomic characteristics of those living in high-risk areas.

CMHC Project Officer : *Roberto Figueroa*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 36260214
STATUS : Ongoing

HOUSING RESEARCH

OVERVIEW OF THE CURRENT STATE OF KNOWLEDGE ON THE NATURE AND EXTENT OF BROADER (NON-HOUSING) SOCIETAL OUTCOMES OF HOUSING

This research will provide an overview of the current state of knowledge on the nature and extent of broader (non-housing) societal outcomes of housing related to education, skills development and employment. It will review existing empirical evidence of the role of housing in contributing to broader societal outcomes, assess the current state of knowledge regarding linkages between housing and broader societal outcomes, identify data gaps, examine related methodological challenges and identify future research challenges and opportunities.

CMHC Project Officer : *Ed Nera* **CIDN** : 34430200

Division : Policy and Research Division **STATUS** : Ongoing

AVAILABILITY : Product is not yet available

UNDERSTANDING THE STATUS OF VISITABILITY

The goal of this External Research Program study is to analyze the situation regarding Visitable housing in Canada and to determine related barriers, facilitators, best practices, gaps, trends and issues.

Note: No. 08-011 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65959)

CMHC Project Officer : *Jim Zamprelli* **CIDN** : 34380215

Division : External Research Program **STATUS** : Ongoing

AVAILABILITY : Research Highlight is available

INFRASTRUCTURE

DEVELOPMENT OF COSTING MECHANISM(S) TO FACILITATE SUSTAINABLE COMMUNITY PLANNING

The purpose of the project is to develop a mechanism(s) that will allow community planners to effectively calculate and convey the full, accurate, long and short term public infrastructure costs of both conventional and more sustainable community planning scenarios. Phase 1 will identify relevant commercially available or partially developed infrastructure costing models and tools and community scenario building tools; identify current relevant sources of financial costing information related to the direct, indirect and external costs affected by development; document current costs for a full range of conventional and alternative infrastructure elements; identify the key costs affected by urban form and the factors that affect them most; apply the key costs to six development scenarios and develop cost/revenue statements for each scenario; construct a methodology to permit planners to effectively calculate and convey reliable net public cost projections for a full range of sustainable community planning scenarios; and if no tool currently exists, develop a framework for a methodology or tool by which the diverse sources and currently unrelated tools used above might be integrated into a single costing/scenario development exercise. Phase 2 of the project, which is currently undergoing internal testing has developed a costing scenario tool using the data collected in Phase 1. This user friendly costing mechanism will allow planners, politicians and other stakeholders to quickly compare and adjust the full, life cycle (75 year) costs of various planning scenarios during the community planning process.

Note: No. 08-001 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65933)

CMHC Project Officer : *Douglas B Pollard* **CIDN** : 26950200

Division : Policy and Research Division **STATUS** : Ongoing

AVAILABILITY : Research Highlight is available

LAND DEVELOPMENT

PROFILE OF THE LAND DEVELOPMENT INDUSTRY IN CANADA

The key objective of this study is to develop a profile of the land development industry in Canada. Critical to achieving this objective is gaining a clear understanding of what the land development industry is. To accomplish this, the research will be based on an examination of data from Statistics Canada and a review of existing literature. The literature review will serve to define land development, including its role in the national economy generally, and the residential construction industry in particular.

A nationwide industry survey will be a central element of the research. Interviews will be conducted in 16 major urban centres. Survey results will be used to identify drivers of change in the land development industry, such as environmental and public policy initiatives, and will also allow the analysis of how the industry has adapted and developed in response to these drivers. The results of the survey will also be used to identify challenges facing the land development industry over the next 10 years.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32540200
STATUS : Ongoing

PERSONS WITH DISABILITIES

EFFECT OF SNOW AND ICE ON EXTERIOR RAMP NAVIGATION BY WHEELCHAIR USERS

Winter represents the most difficult season for people with mobility deficits. These difficulties include slips, falls, increased walking effort, and snow-ice wheelchair obstructions. Considering the amount of time Canadians spend in winter, a remarkably small amount of literature exists on non-sporting winter activities. As a result, guidelines and standards for buildings are predominately based on "dry-land" studies. In the case of residential access ramps, anecdotal feedback from wheelchair users identifies problems with winter accessibility due to the snow-ice surface properties.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 36260211
STATUS : Ongoing

HOUSING THE INTELLECTUALLY DISABLED IN INTENTIONAL COMMUNITIES: IDENTIFYING RELEVANT PHYSICAL AND GOVERNANCE STRUCTURES

The Saskatchewan Association For Community Living (SACL) and Saskatoon Housing Initiatives Partnership (SHIP) have a joint interest in filling the gap in research pertaining to housing persons with intellectual disabilities within a non-congregated, supportive, community context. This research project seeks to alleviate the gap in knowledge currently surrounding housing options for individuals with an intellectual disability. While much has been published on the topic of housing for persons with physical disabilities, little is available to identify the specific supportive elements necessary for the inclusion of individuals with an intellectual disability into typical residential communities.

CMHC Project Officer : *Jim Zamprelli*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 34380218
STATUS : Ongoing

INTERIOR DESIGN STUDENT COMPETITION FOR FLEXHOUSING DEMONSTRATION FACILITY AT CCHT

This is a student interior design competition where students will create inexpensive interior design ideas for the demonstration FlexHouse at the Canadian Centre for Housing Technology (CCHT). The FlexHousing demonstration facility at CCHT will be renovated to incorporate the winning designs.

CMHC Project Officer : *Jim Zamprelli* **CIDN** : 32910200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

LONGITUDINAL STUDY OF HOUSING FOR MENTAL HEALTH CONSUMER-SURVIVORS

This research project will compare the outcomes of two mental health housing programs, supportive housing and rent supplement, including tenants' satisfaction and preferences.

CMHC Project Officer : *Anna Lenk* **CIDN** : 34380213
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PATTERNS OF USE OF DIFFERENT TOILET GRAB BAR CONFIGURATIONS

A previous study looking at different toilet grab bar configurations showed that ambulatory and non-ambulatory seniors highly prefer the presence of a grab bar on both sides of the toilet seat contrary to American and Canadian recommended guidelines. This External Research Program study will focus on the "patterns of use" of six (6) different toilet grab bar configurations having grab bars on both side of the toilet seat.

CMHC Project Officer : *Luis Rodriguez* **CIDN** : 34380216
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PROFILE HOUSING CONDITIONS OF PERSONS WITH DISABILITIES

The project will analyze data from Statistics Canada's 2001 post censal Participation Activity Limitation Survey (PALS) for the production of a series of research highlights profiling the housing conditions of persons with disabilities - the first based on the 2001 Census data, and subsequent highlights focussing on specific disability areas such as agility and mobility, hearing, seeing, speaking/communication, psychiatric or mental health issues, developmental/intellectual, learning disabilities, as well as the specific needs of children and seniors. These will be based on the 2001 PALS data with links to CMHC's core housing need variable and a range of socio- economic and demographic characteristics from the Census.

CMHC Project Officer : *Janet Kreda* **CIDN** : 35780200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PERSONS WITH DISABILITIES

PROFILE OF HOUSING CONDITIONS OF PEOPLE WITH DISABILITIES - DATA ACQUISITION

The objective of this data acquisition project is to support the development of ten research highlights on the housing conditions of persons with disabilities based on Statistics Canada 2001 Participation and Activity Limitation Survey (PALS). Consultations with stakeholders, both internal and external (Office for Disability Issues (ODI) with HRSDC as well as national disability organizations) were held in the fall of 2007 to determine the specifications and research issues for this research. The Statistics Canada PALS data will be linked to CMHC's 2001 Census-based indicators and core housing need files. A consultant has been engaged to access Statistics Canada data directly on a range of socio-economic, demographic and disability characteristics to support the development of the research highlights.

CMHC Project Officer : *Janet Kreda* — ***CIDN*** : 29550200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ****NEW****

UPDATING AND ENHANCING CMHC PUBLICATIONS REGARDING CONSTRUCTION AND RENOVATION OF HOMES FOR PEOPLE WITH DISABILITIES

The objective of this project is to produce a number of publications in the CMHC About Your House (AYH) series for use by persons with disabilities, architects, occupational therapists, renovators, builders and the general public. Each will be based on information, to be updated, in the publication "Housing for Persons with Disabilities" and will take into account information contained in other FlexHousing™ and Healthy Housing™ publications. The titles for the AYH series include House Plans and Design, Fire Safety, Interior and Exterior Ramps, Kitchens, Bathrooms and Living Spaces, among others.

CMHC Project Officer : *Jim Zamprelli* — ***CIDN*** : 31960200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ****NEW****

RENOVATION AND INSPECTION

ESTIMATING THE COSTS AND BENEFITS OF HOME RENOVATIONS TO ACCOMMODATE AGING AND DISABILITY

This project will apply the new CMHC cost-benefit framework, or model, to estimate the costs and benefits of home renovations to accommodate aging and disability relative to long-term care institutionalization. The project will include a national survey, involving personal interviews with at least 250 RRAP-D and HASI program beneficiaries and 200 telephone surveys to generate statistically reliable estimates of the costs and benefits. At least 50 caregivers of program beneficiaries will also participate. Following the conduct of the surveys, the resulting cost and benefits of the renovations will be compared with available data on the cost and benefits of long-term care institutionalization. This project will produce estimates of the costs and benefits, and cost-benefit ratios, of home renovations to accommodate aging and disability. Such estimates would be useful to policy at the Federal/Provincial/Territorial/Municipal levels related to funding such housing renovations and to the health services sector, regarding related support services programs for seniors and persons with disabilities. The societal impact on care giving and the health care sector will be examined.

CMHC Project Officer : *Luis Rodriguez* — ***CIDN*** : 35440200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FEDERAL GOVERNMENT RENOVATION ASSISTANCE EVALUATION PLAN

CMHC renovation programs provide financial assistance to homeowners and landlords to preserve affordable housing and ensure that housing occupied by low-income households meets basic health and safety standards. These programs also assist with home modifications and adaptations to enable low-income seniors and persons with disabilities to live independently in their own home. Thirdly, they help with funding to improve or create shelters for victims of family violence and preserve or create, via conversions from non-residential properties, housing for people who are at risk of homelessness.

Federal investments in renovation programs are delivered by CMHC or via provincial and territorial governments, and are available in all regions of Canada, including First Nations communities. As of the time of program renewal in late 2006, more than 750,000 households had benefited from assistance through the renovation programs since 1973. Indian and Northern Affairs Canada (INAC) delivers renovation programs on-reserve, in addition to CMHC's programs.

The suite of CMHC renovation programs in this evaluation plan are as follows:

- Residential Rehabilitation Assistance Program (RRAP) for Homeowners;
- Rental/Rooming House RRAP;
- Conversion RRAP;
- Emergency Repair Program;
- RRAP for Persons with Disabilities; and
- Home Adaptations for Seniors' Independence.

The evaluation plan provides background information on the programs; reasons for the evaluation; outlines the scope of the evaluation, the issues and methods to be used; and presents a summary of evaluation data sources.

Ottawa: Audit and Evaluation Services, Canada Mortgage and Housing Corporation, 2008. 24 pages (1232 KB)

Disponible aussi en français sous le titre : Programmes d'aide à la renovation du gouvernement fédéral : plan d'évaluation

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_bilingual/Fedral_RRAP(W).pdf

See also: Technical Research on Renovation and Inspection, p. 44

RENTAL HOUSING

AFFORDABILITY CHALLENGES AND RENTAL MARKET DYNAMICS IN SMALL NOVA SCOTIA COMMUNITIES WITH COMMUNITY COLLEGE CAMPUSES

The objective of the work is to understand the capacity of rental markets in small towns in Nova Scotia to provide a range of affordable housing options for residents and for students attending community colleges. The research will focus on Truro, Stellarton, and Port Hawkesbury. The work will consist of a background literature review, market analysis, student profiles, and local resident profiles plus primary research involving stakeholder interviews, student surveys, and focus groups of residents.

CMHC Project Officer : *Roger D Lewis*

CIDN : 36260203

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDE FOR RESIDENTIAL RENTAL PROPERTY INVESTORS

The objective of this project is to produce the content for a best practice guide for individual residential rental property investors in the Toronto Census Metropolitan Area, a guide which will become a template for developing other city-specific best practice guides for rental property investors. The guide content and accompanying tools will provide detailed information on property acquisition and property management. It will include a profile of the Toronto rental environment and information specific to various property types. This guide will ultimately help raise awareness of the rental investment process and serve as an alternative to outsourcing the management of the properties.

CMHC Project Officer : *Meg Ogden* — ***CIDN*** : 30740200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ECONOMICS OF NEW PRIVATE RENTAL HOUSING DEVELOPMENT: 2006 UPDATE ADDITIONAL ANALYSIS

This project will result in a condensed version of the original report entitled "The Economics of New Private Rental Housing Development: 2006 Update". This version would focus on medium project types and have more detailed explanation of the assumptions used. The project would also include the provision of alternate assumptions or data where necessary.

CMHC Project Officer : *Eric Tsang* — ***CIDN*** : 36490200
Division : Strategic Planning — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ****NEW****

EFFECTS OF PENSION FUND RENTAL HOUSING EQUITY INVESTMENT VEHICLES ON RATES OF RETURN

This External Research Program project will analyze the magnitude and nature of the effects of the currently available pension fund investment vehicles on risk-adjusted rates of return to investments in rental housing, including affordable rental housing projects. The scope of the study will encompass both general rental housing projects as well as affordable-rental-housing public-private-partnership (ARH-PPP) projects. The study will utilize a real estate asset pricing model (APM) that replicates the features of the investment vehicles actually available to funds, including, taxable corporations, real estate investment trusts (REITs), real estate investment corporations (REICs), pooled trusts and partnerships. The appropriateness of including debt instruments will also be explored.

CMHC Project Officer : *Kamal C Gupta* — ***CIDN*** : 36260213
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ****NEW****

EXAMINE THE FEASIBILITY FOR BROADER APPLICATION OF HARM REDUCTION STRATEGIES TO PROVIDE STABLE HOUSING FOR SUBSTANCE USERS

The CMHC Teleforum focused on strategies for implementing Housing First, an approach which involves integrating Housing First clients in non-profit or private rental buildings that serve a mix of tenants, rather than in buildings dedicated to the target population. Participants heard from experts who have used this Housing First approach for several years. These experts work with homeless people living with significant challenges - including substance use and/or mental health issues. This Teleforum appealed to policy makers at all levels of government and in a variety of organizations, agencies that work with homeless people, health care professionals, and housing providers considering dedicating a portion of units to homeless people. There were over 200 participants from across Canada.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 35380200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : There will be no product for this project

REGULATIONS IN THE RESIDENTIAL CONSTRUCTION INDUSTRY IN QUEBEC AND THEIR EFFECTS ON THE COST OF RENTAL HOUSING

This research will assess the impact of the variety of regulations affecting residential construction in Quebec on the cost of rental housing. The author will conduct a literature search of residential building regulations and interview experts in the housing industry, including building officials in the Ville de Québec, representatives of the Commission de la construction du Québec (CCQ), l'Association de la construction du Québec (ACQ), the Corporation des entrepreneurs généraux du Québec (CEGQ), and several residential builders. The researcher will estimate the costs of residential construction attributed to these regulations, and their effects on housing rents.

CMHC Project Officer : *Barry Craig* ***CIDN*** : 28920202

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

UPDATING THE CMHC ON-LINE RENTAL GUIDE: YOUR GUIDE TO RENTING A HOME

The purpose of this project is to update the CMHC on-line Rental Guide both in content and reference information such as website links.

CMHC Project Officer : *Ian Melzer* ***CIDN*** : 33610200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

CASE STUDIES OF SUSTAINABLE GREENFIELD RESIDENTIAL DEVELOPMENTS

The current approach to residential development that consumes open space on the urban fringe for single-detached dwellings on large lots is recognized as neither economically nor environmentally sustainable. This project is to document sustainable ("green") residential development case studies from across Canada so that developers, municipalities, housing professionals, and community groups can learn about success stories and replicate these "green" solutions, where applicable.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 29490200
STATUS : Ongoing

IMPACT OF DEVELOPMENT COST CHARGES ON HOUSING AFFORDABILITY

The objectives of this project are to:
(i) investigate the impact of development cost charges on the price and affordability of housing in Canada;
(ii) identify the costs and benefits of both infill and new subdivision developments in Vancouver, Calgary, Winnipeg, Toronto, Montreal and Halifax; and
(iii) quantify the up-front and ongoing costs or benefits of infill and new subdivision development on the residents of the new development, residents of existing developments, the local government and the community at large.

CMHC Project Officer : *Fanis Grammenos*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 34060200
STATUS : Ongoing

LIVEABLE LANES: OVERCOMING BARRERS TO LANE WAY INFILL HOUSING IN B.C.'S GROWING COMMUNITIES

This study aims to identify and shed light on barriers to lane way infill housing in B.C.'s growing communities. It will develop strategies and recommendations for overcoming them and broaden interest in lane way infill housing among residents, builders and other housing sector stakeholders. A final report has been submitted and is being reviewed.

CMHC Project Officer : *Lynn Armstong*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 34380209
STATUS : Ongoing

MODELING AND ASSESSING LOWER RAINWATER RUN-OFF IN STRATFORD, ON

This research investigated the relationship between storm water run-off reduction and approaches to street pattern design. The work used a new computerized model for estimating run-off, the Water Balance Model, that calculates run-off quantities based on the hydrological, site and development data. The outcome of this analysis will help inform municipalities and developers of opportunities for run-off reduction using suitable planning components and tools. The analyses show that streets are a critical element in managing rainwater runoff: they are the largest, single impermeable surface element, the most polluting and the most difficult of which to mitigate the effects. Approaches that optimize the road area and maximize open space both private and public, such as the Fused Grid, help retain the water on site.

CMHC Project Officer : *Fanis Grammenos*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 34120200
STATUS : Ongoing

MUNICIPAL PLANNING POLICY FOR THE MITIGATION OF RESIDENTIAL ENCROACHMENT ACTIVITIES WITHIN THE EDGES OF URBAN FORESTS

This study evaluates the effectiveness of municipal policies in southern Ontario that seek to limit the encroachment activities of adjacent residents within municipal forests. It will also determine the type, intensity and real extent of the evidence of encroachment activities. A final report has been submitted and reviewed.

CMHC Project Officer : *Lynn Armstrong*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

RESIDENTIAL DEVELOPMENT AROUND TRANSIT NODES

This project will result in 10 case studies of residential development around transit nodes across Canada. This will be done by interviewing the developers and municipal planners involved in the developments and surveying occupants. The aim is to provide developers, municipalities and housing professionals with insights into the successes of the developments and how challenges were or could be overcome, to help them in replicating and building on those solutions. The first five case studies have been finalized and are in the publication process. An additional four draft case studies have been received and are being reviewed.

CMHC Project Officer : *Lynn Armstrong*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

STORMWATER MANAGEMENT CASE STUDIES

This project will examine 5 built case studies of green stormwater management innovations in residential developments in Canada. The study would examine the successes and lessons learned about those practices including their marketability and profitability, costs (particularly in comparison to standard practices), design and technical barriers and innovations, regulatory issues, occupant satisfaction, municipal involvement, liability issues, etc. The goal is to inform other developers of the successes and lessons learned from these innovative practices so they can replicate and build on those solutions. It will result in the publication of 5 case studies and a research highlight synthesizing the findings of the case studies.

CMHC Project Officer : *Lynn Armstrong*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 35250200
STATUS : Ongoing

TREE PRESERVATION IN RESIDENTIAL DEVELOPMENTS: CASE STUDIES

This project will examine 10 case studies of innovative residential developments where the developer preserved a significant number of existing trees. The study would examine the successes and lessons learned including marketability and profitability, costs, design and technical barriers and innovations, regulatory issues, occupant satisfaction, municipal involvement, liability issues, etc. The goal is to inform other developers of the successes and lessons learned from these innovative developments so they can replicate and build on those solutions.

CMHC Project Officer : *Lynn Armstrong*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 35260200
STATUS : Ongoing

UNBLOCKING BARRIERS TO INNOVATIVE STREET PATTERNS AND STORMWATER ALTERNATIVES

This project examines and documents five successful examples of solutions where neighbourhood planners found ways to work successfully with other municipal officials, such as engineers and landscape architects, to implement innovative street pattern or stormwater management approaches (also known as Alternative Development Standards -ADS) that had previously been rejected because they were non-standard. Key lessons will be drawn for communication to planners, developers and other officials across the country.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 36730200
STATUS : Ongoing
****NEW****

ADAPTER LE LOGIS POUR PROLONER L'AUTONOMIE : ÉTUDE DE CAS DE 13 AINÉS FRAGILISÉS EN BANLIEUE DE QUÉBEC

This qualitative research examined the process and experience of adapting the homes of frail seniors living in suburban houses. The researchers looked at the technical and financial assistance received by the senior residents and their perception of the adaptation experience. They also sought the viewpoints of the professionals, such as occupational therapists, architects, architectural technicians and builders, involved in the home adaptation process.

This research project attempted to answer the following questions:

1. What are the factors that trigger home adaptations?
2. What financial and technical assistance is available for home adaptations?
3. What are the steps involved in a typical adaptation project under the province of Quebec universal assistance program?
4. What are the most common adaptations for single-family houses?
5. What is the perception of frail seniors and their relatives of the home adaptation process?
6. How satisfied are the individuals with the adaptations?

Senior residents were unanimous in saying that the adaptations improved the comfort and quality of life for themselves and their family members. They felt safer, with the risks of falls and injuries considerably reduced.

Prepared by Geneviève Vachon and Carole Després with the collaboration of Sébastion Lord. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2007 (External Research Program Research Report) 39 pages (5828 KB)

Note: No. 08-009 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 66004)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/Adapter_le_logis(W).pdf

ADAPTING THE HOME ENVIRONMENT FOR ALZHEIMER'S AND RELATED DEMENTIA: COLLABORATIVE RESEARCH CREATING A SELF ASSESSMENT TOOL

The objective of this research is to develop a self-assessment tool that will function as a community resource to guide individuals experiencing Alzheimer's Disease and Related Dementia (ADRD) and their families through the process of adapting their home environment while reflecting their individual needs and concerns The research will be conducted in close collaboration with persons with ADRD and their caregivers.

CMHC Project Officer : Luis Rodriguez
CIDN : 28920214
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CARING FOR AGING PARENTS: SENIOR ADULTS LIVING WITH ADULT CHILDREN IN PRAIRIE CENSUS METROPOLITAN AREAS

This project's objective is to provide research findings to help the housing industry learn the degree of commitment that exists for this type of personal family care for older parents and assess the implications for the housing market of this form of housing demand.

CMHC Project Officer : *Brian Hollohan*
CIDN : 23031000
Division : Market Analysis Centre
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DETERMINING THE IMPLICATIONS OF THE AGING OF THE CANADIAN POPULATION FOR HOUSING AND COMMUNITIES

The objective of this project is to examine the specific implications of the aging of the Canadian population for housing and communities. The research will be based on existing data and literature, new practical information from experts and key informants in communities, and case studies of communities that have already reached the proportions of seniors that Canada is expected to have over the next 30 years. The emphasis will be on identifying the challenges and opportunities for planning, designing and managing communities (i.e. cities, small towns and suburbs) with increasing older populations. While the project will deal with a range of issues, the main focus will be on urban form and housing. Other related issues, such as transportation, will have a secondary focus.

Note: No. 08-003 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65913)

CMHC Project Officer : *Luis Rodriguez* — ***CIDN*** : 27420200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Research Highlight is available

DEVELOPMENT OF TRAINING MODULES AND CURRICULUM ON HOUSING FOR SENIORS AND PEOPLE WITH DISABILITIES FOR THE ARCHITECTURAL PROFESSION AND EDUCATION INSTITUTIONS WITH CONSTRUCTION-RELATED PROGRAMS

The objective of this project was to identify the most effective techniques for the development and delivery of seminars on seniors' housing for architects, architectural technologists, and other building and design professionals. The outputs of the project were learning and training materials, as follows:

1. A Module on Residential Adaptations for Independent Living - a PowerPoint presentation, case study, proficiency exercises, a Facilitator's Guide and a Student Guide;
2. A Module on Designing for Dementia - a PowerPoint presentation, a Facilitator's Guide and a Student Guide; also
3. A case study and proficiency exercises were developed as interactive materials to be used in a web environment.

Material will be available on the CMHC web site, www.cmhc.ca, in due course.

CMHC Project Officer : *Jim Zamprelli* — ***CIDN*** : 26780200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Seminar/training is available

GOVERNANCE OF SOCIAL HOUSING FOR SENIORS: A COMPARATIVE ANALYSIS

The primary objective of this research is to compare the governance of housing for seniors in Quebec, Ontario and Denmark and, in particular, the linkage between housing and home support services. The assumption is that certain types of governance promote a better linkage between home support and housing, but that the players are also important in this linkage. The goal is to find out which structures and which initiatives seem better.

CMHC Project Officer : *Luis Rodriguez* — ***CIDN*** : 28920206
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOUSING OPTIONS STUDY FOR OLDER ADULTS IN THE REGION OF PEEL

The purpose of the research project is to gather data on housing preferences and needs of older adults in the Region of Peel aged 55 years and older. There are three main goals of the research project:

1) To develop, distribute and analyze responses to a survey that captures the key areas of information required;

2) To facilitate focus groups to obtain required housing needs and preference information;

3) To develop an appropriate approach to obtain required housing needs and preference information from older adults who are identified as being isolated.

CMHC Project Officer : *Brett C Barnes* **CIDN** : 30390200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PROBABLE EFFECTS OF AN AGING POPULATION ON THE HOUSING MARKET: A PROSPECTIVE STUDY

In the coming decades, Quebec will be confronted by an aging population. Though the impacts on employment seem obvious and well documented, the same cannot be said, unfortunately, for the housing field, even though the consequences will be just as important. This research will follow the path baby boomers have been taking since 1965 and will attempt to identify the main upheavals that will affect the housing market from now until 2050.

CMHC Project Officer : *Luis Rodriguez* **CIDN** : 36260206
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PROJECTING THE HOUSING NEEDS OF AGING ATLANTIC CANADIANS

This research will examine the current housing and support service needs of Atlantic seniors at both the provincial and regional levels. The research team is being led by Mount Saint Vincent University with the collective efforts of a research alliance of 37 members encompassing all four Atlantic Provinces, and representing universities, seniors organizations, housing developers, service providers, and government departments. Funding has been provided by the Social Sciences and Humanities Research Council through the Community-University Research Alliance Program. Funding contributions have also been made by Canada Mortgage and Housing Corporation, the Nova Scotia Department of Community Services, Mount Saint Vincent University, Dalhousie University, University of New Brunswick and the University of Prince Edward Island.

CMHC Project Officer : *Luis Rodriguez* **CIDN** : 29520200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

REGULATING SUPPORTIVE HOUSING FOR SENIORS: A COMPREHENSIVE STATUTE MODEL

Provinces across Canada are currently addressing the need to develop supportive housing for seniors and, as a necessary corollary to that need, development of a regulatory framework. Effective regulation in this sector must protect the rights and interests of residents without replicating the maximum legislated standards that apply to care facilities or nursing homes. The appropriate balance is difficult to achieve. Previous research carried out by the applicant researcher indicated that a comprehensive statute provided the most workable model for regulation in this area. The proposed project would build on that work to create a model comprehensive statute that would include provisions affecting the necessary balance. The model statute and accompanying report would serve as a useful tool for policy makers working in this area.

CMHC Project Officer *: Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 36260207
STATUS : Ongoing

SMART GROWTH, LIVABLE AND SUSTAINABLE COMMUNITIES FOR SENIORS

This research investigated the relationship between smart growth concepts and the creation of livable and sustainable communities that would facilitate aging in place. Based on the findings of a literature review and focus groups with seniors, the researchers developed a set of indicators to measure the extent to which a community's built environment benefits seniors' health, quality of life, and well-being. The researchers interviewed 30 planners and other experts who provided feedback on the indicators and helped to refine them. After conducting a pilot test with two communities to gather feedback on the utility of the indicators and the availability of the data required to support their use, the researchers incorporated this information to develop a revised set of indicators. Local planners can use these indicators as a tool for setting goals related to the built environment needs of an aging population and for tracking progress against those goals.

Prepared by Industrial Economics, Incorporated in collaboration with Gloria Gutman. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2008. 2 parts (Part 1: Final Research Report, 115 pages (1619 KB); Part 2: Phase Reports, 201 pages (1686 KB))

Note: No. 08-014 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 66099)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/part1(w).pdf (Part 1)
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/part2(w).pdf (Part 2)

See also: MAXIMIZING ENERGY EFFICIENCIES IN A MULTI-UNIT RESIDENTIAL BUILDING, p. 47

EVALUATING SOCIAL HOUSING AS A HEALTH INTERVENTION IN THE GTA WEST AREA

This study will provide evidence-based knowledge of the impacts of improved housing conditions on the health status of low-income Canadians in order to support more informed discussion and decisions concerning the contribution that housing programs make to improving the health of vulnerable populations. It will gather data from persons initially on the waiting lists of housing authorities in an area west of Toronto.

CMHC Project Officer : *Ian Melzer*
CIDN : 35330200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

REGENT PARK LONGITUDINAL HEALTH STUDY

This study will investigate the effects of the Regent Park Social Housing Revitalization Project - Phase I Redevelopment on the health and well-being of residents, and how interventions in the built environment may reduce health inequalities and improve the lives of low-income, urban populations, using a quasi-experimental research design. The redevelopment plan seeks to: a) create social mix; b) promote positive social interaction (using innovative architectural and urban designs); and c) create affordable home ownership for a subset of residents.

CMHC Project Officer : *Mark Salerno*
CIDN : 34470200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

REGENT PARK REVITALIZATION: YOUNG PEOPLE'S EXPERIENCE OF RELOCATION FROM PUBLIC HOUSING REDEVELOPMENT

This External Research Program project will assess the social impacts of relocation of residents — particularly young people aged 12-17 years — during redevelopment of their public housing community. Toronto Community Housing Corporation (TCHC) recently began phased redevelopment of Regent Park, Canada's oldest and largest public housing project.

CMHC Project Officer : *Cynthia Rattle*
CIDN : 36260209
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SOCIAL HOUSING SURVEYS AND ANALYSIS IN SUPPORT OF THE LONG-TERM MANAGEMENT OF THE STOCK

This project involves the development and implementation of a methodology for data collection and analysis of the current physical condition of social housing, the socio-economic characteristics of residents and financial conditions (including adequacy of replacement reserves) of social housing in the context of planning for the longer-term management of this housing. The second part of this project will involve the actual survey and analysis work. The consultant will use the methodology developed under phase one to collect and assess the data, and prepare a report.

CMHC Project Officer : *Brian Davidson*
CIDN : 38230200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
****NEW****

COMMUNITY AND DESIGN CHARRETTES PLANNING WITH ENHANCED FOLLOW-UP SUPPORT

This project will enable the development of a community plan that implements sustainable neighbourhood design and housing practices identified in a community planning charrette and includes follow-up support for the refinement and implementation of design alternatives identified in the charrette.

CMHC Project Officer : *Douglas B Pollard* ***CIDN*** : 36510200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ****NEW****

CONTINUING EDUCATION ARTICLES FOR PLANNERS

These CMHC web-based Continuous Professional Learning articles will provide up-to-date and in-depth knowledge to professional planners on leading edge research issues. Two topics are the subject of this project: Brownfield Regeneration and Growth Management. The first examines Brownfields as an opportunity to relieve pressure for city expansion, while the second looks at growth as an opportunity to apply techniques that will reduce its environmental impact.

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 34500200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FAMILIES LIVING DOWNTOWN: CHALLENGES AND BENEFITS

This External Research Program study will examine the housing-related experiences of families who are choosing to live in or near downtown areas. It will examine the reasons for their choice, how they are managing their urban life with their children, and the challenges and benefits they experience once they have lived there for some time. These experiences will be related to key objective measures of their own residence and their downtown neighbourhood. This research will complement previous views on how to plan central areas for families by studying the experiences of downtown family residents, those who actually "live their life" there.

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 34380210
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

INDEX FOR LANDSCAPE GUIDE FOR CANADIAN HOMES

This project will add the following new and updated features in "Landscape Guide for Canadian Homes": an index, photos of each plant in the plant list, updates to "resources and further reading" section e.g. update web links to further enhance the user-friendliness of the guide.

CMHC Project Officer : *Mark Holzman* ***CIDN*** : 36710200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ****NEW****

REDUCING THE PLANNING APPROVALS PROCESS THROUGH ENHANCED SUSTAINABILITY: DOCKSIDE GREEN CASE STUDY

This project will examine the success of the Dockside Green development in Victoria, BC, in reducing the anticipated planning approvals process from over three years to under one year. By incorporating sustainable development features, the project generated tremendous community support that resulted in no opposition during the planning approvals process, saving significant time and money for both the developer and the municipality. The project will document the process, other future approvals that may be required, and the verification process used by the City to ensure the sustainable features were incorporated as promised. The research will also examine the developers' motives behind incorporating specific features, the lessons from their experience, and any changes in the City's position on sustainable community planning.

CMHC Project Officer : *Lance Jakubec*	***CIDN*** : 35240200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SUSTAINABILITY INDICATORS FOR COMPUTER-BASED TOOLS IN COMMUNITY DESIGN

This External Research Project will evaluate sustainability indicators for potential integration with widely used geographic information system based modelling and visualization tools. It will refine the content and method of the indicators most suitable for such integration, propose new indicators where necessary, test refined and proposed indicators in a case study project and evaluate the results for broad application.

CMHC Project Officer : *Douglas B Pollard*	***CIDN*** : 34380211
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SUSTAINABLE COMMUNITY PLANNING AND DESIGN CHARRETTE SUPPORT AND PARTICIPATION

This project will continue to contribute to sustainable community design charrettes by providing financial and event planning assistance and/or direct CMHC staff participation and publication of results for certain selected charrettes. A charrette was held in Fort McMurray Alta. and Perth Ontario. There will be another in Winnipeg and other potential charrettes have been identified and are being pursued.

CMHC Project Officer : *Douglas B Pollard*	***CIDN*** : 34110200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

UNDERSTANDING THE SMART GROWTH GAP

This project will investigate the reasons for the gap between stated municipal policy objectives, which align with the goals of Smart Growth, and the results on the ground. It will aim to answer the following questions:

- What prevents the accomplishment of set goals?
- Are the goals inherently unachievable?
- What are the expected impacts of Smart Growth practices under a normal positive scenario?
- What time lines can be speculated or calculated for prescribed outcomes?
- What strategies are deemed most effective with respect to the level of impact?

The intent of this research is to enable local governments and industry to lay out a strategy that will produce sustained positive outcomes with predictable beneficial effects for the environment and for the well-being of community residents.

CMHC Project Officer : *Fanis Grammenos* — ***CIDN*** : 35230200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

USER PILOTING OF THE INFRASTRUCTURE COSTING MECHANISM

This project will consist of internal and external workshop sessions where tool development experts will work with selected community stakeholders to validate and refine the current "beta" version of the costing mechanism to facilitate sustainable community planning. These sessions will assess the accuracy and usability of this tool prior to its final release by CMHC. The sessions will allow individuals from CMHC Research as well as a range of Canadian regions and municipalities to test this new tool on known situations as well as their own planning scenarios and to compare results.

CMHC Project Officer : *Douglas B Pollard* — ***CIDN*** : 32670200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

See also: Technical Research on Sustainable Development & Healthy Housing, p. 44-49

ASSESSING TRAVEL AND ENVIRONMENTAL ASPECTS OF THE FUSED GRID

This research project investigated the relationship between street network type and travel behaviour. The focus was on testing the performance of the 'Fused Grid' street network design, using empirical measures of micro-scale street environment and travel survey data. Of particular interest is whether street networks that approximate the Fused Grid (high connectivity for non-motorized modes with disconnected routing for motor vehicles) actually result in greater non-motorized mode share and reduced motor vehicle use when compared to other street network types. Results suggest that the relative connectivity of pedestrian and vehicular modes is an important predictor of the choice to walk from home to destinations within a short distance. The study adjusted for socio-demographic and urban form factors (density and land use mix) and concludes that the highest proportion of trips on foot (18%) is observed in areas where it is relatively more direct to nearby
retail and recreational destinations on foot than by car. The lowest proportion (10%) of trips occur on foot in places where there is a low degree of pedestrian connectivity. However, the level of vehicular connectivity in these areas does not seem to relate with walking. Interestingly, the study finds that places with both high levels of pedestrian and vehicle connectivity have only about 14% mode share on foot.

Note: No. 08-013 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 66086)

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 28920205

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Research Highlight is available

ASSISTING MUNICIPALITIES AND DEVELOPERS TO EVALUATE AND APPLY THE FUSED GRID CONCEPT: PART 1 - A TRAFFIC ANALYSIS STUDY

This study compared the traffic performance of three different neighbourhood layouts including district and regional streets in a real setting. It assessed the relative merits of various road network and land-use approaches, including the conventional suburban development (featuring loops and cul-de-sacs); the traditional neighbourhood development or TND (featuring the traditional city grid); and a Fused-Grid layout, which combines elements of the traditional grid with those of conventional suburban layouts. The analysis shows that a) the Fused Grid layout exhibits the best traffic performance, particularly with increased density of development b) a hierarchical network layout can improve traffic performance c) one-way couplets improve traffic flow on arterials d) the Fused Grid reduces traffic volumes on lower classification streets. Other findings suggest that a new approach to street network planning such as the Fused Grid can improve the efficiency of the network, lower road infrastructure costs and improve the quality of life of the residents. A final report has been received. A Research Highlight has been prepared.

Note: No. 08-012 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 66071)

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 34160200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Research Highlight is available

SHELTER ENHANCEMENT PROGRAM 2007 EVALUATION PLAN

Canada Mortgage & Housing Corporation (CMHC) has been involved in the development of Canada's shelters to address family violence since the mid-1970s. Many of the earliest shelters were established with financing from CMHC's National Housing Act (NHA) Non-Profit Programs (Special Purpose housing). Since 1988, CMHC has played a key role in the federal Family Violence Initiative (FVI) by significantly expanding the number of shelters across Canada, developing an integrated system of first- and second-stage housing, and enhancing the quality of shelters for abused women

and their children through its Project Haven, Next Step and Shelter Enhancement Program (SEP).

The 2007 SEP Evaluation is intended to meet CMHC's reporting requirements under the federal FVI and accountability requirements related to the CMHC Special Initiatives (Renovation) funding. It will provide an updated assessment of the program following revised funding guidelines in 2003. The 2007 evaluation will cover the time period since the previous SEP evaluation (2001/02) up to 2006/07. It will examine SEP funding for both new shelters and for renovations, and all types of projects (for women and their children, youth and men) totalling $105.7M in federal funding since 2001/02. The 2007 Evaluation will examine the rationale, success and impacts, and cost effectiveness of the Program including assessment of funding for youth and men's shelters as well as for First Nations.

The evaluation plan provides a description of the Shelter Enhancement Program, outlines evaluation issues, methods, indicators and data sources to be used. An evaluation timetable is included.

Ottawa: Audit and Evaluation Services, Canada Mortgage and Housing Corporation, 2008. 25 pages (173 KB)

Disponible aussi en français sous le titre : Programme d'amélioration des maisons d'hébergement : plan d'évaluation de 2007

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_bilingual/Shelter%20Enhancement%20Program%202007%20Evaluation%20Plan%20_Eng.pdf

CMHC RESEARCH REPORT LISTINGS

To provide quick and comprehensive access to CMHC research published on a given topic, the Canadian Housing Information Centre compiles comprehensive listings of housing research produced over a number of years on certain topics. Topics chosen are those for which there is ongoing client interest and/or for which CMHC has published considerable research. To obtain an electronic, faxed or mailed copy of any of the lists below, contact the Canadian Housing Information Centre at: 1-800-668-2642 or e-mail us at: chic@cmhc.gc.ca

Listings available at this time include:

- Aboriginal Housing
- Affordable Housing
- Basements, Foundations and Crawl Spaces
- Condominiums
- Environmental Site Assement and Contaminated Lands
- Heating and Ventilation
- Housing and Women
- Housing for Older Canadians
- Indoor Air Pollution
- Lead
- Manufactured Housing
- Mortgages and Housing Finance
- Northern Housing
- Residential Construction Waste
- Self Help Housing
- Straw Bale Housing
- Water Conservation, Reuse and Management
- Acoustics
- Airtightness
- Concrete
- Cooperative Housing
- Healthy Housing
- Homelessness
- Housing Export Opportunities
- Housing for Persons with Disabilities
- Infrastructure
- Log Home Construction
- Moisture Problems
- Newcomers, Immigration & Settlement
- Rental Housing
- Residential Renovation
- Social Housing
- Sustainable Development

Fact sheets on common housing questions, issues and problems.

These documents are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at: http://www.cmhc.ca/en/co/co_001.cfm

Print copies can be obained by calling 1-800-668-2642

Order no.	Series no.	Title
62027	CE 1	**Measuring Humidity in Your Home** Is there condensation on the windows? Are there wet stains on the walls or ceilings? Is there static or sparks whenever you touch something? Diagnose humidity problems in your home. Aussi disponible en français sous le titre : Mesurer l'humidité dans votre maison
62028	CE 2	**Combustion Gases in Your Home** Do you have a gas or oil fired furnace, boiler or water heater? What about a woodstove or fireplace? Take the necessary steps to keep combustion gases out of your home. Aussi disponible en français sous le titre : Les gaz de combustion dans votre maison
62029	CE 3	**Asbestos** What is asbestos? Why is it so useful? What problems can asbestos cause and what options does the homeowner have in dealing with them? Aussi disponible en français sous le titre : Amiante
62030	CE 4	**Hydronic Radiant Floor Heating** Heating option for homes. Tubes are placed in concrete floor with water running through. Popular in bathrooms and kitchen, and can be done for entire house - new or existing. Aussi disponible en français sous le titre : Système de chauffage à eau chaude par rayonnement à partir du sol
62031	CE 5A	**Understanding Window Terminology** This factsheet offers helpful guidance on buying the right type of window for your home. Terminology commonly used in the window industry is also presented. Aussi disponible en français sous le titre : Comprendre la terminologie des fenêtres
62032	CE 6	**Urea-Formaldehyde Foam Insulation (UFFI)** What is UFFI? Why was it banned? Should you be concerned about UFFI? How do you know if your home has UFFI? Aussi disponible en français sous le titre : Mousse isolante d'urée-formaldéhyde (MIUF)

Order no.	Series no.	Title
60515	CE 7	**After the Flood** Protect your health and prevent further damage to your home by following this step-by-step guide to restoring your home after a flood. Aussi disponible en français sous le titre : Après une inondation
60516	CE 8	**Fighting Mold: The Homeowner's Guide** Mold can cause allergies or respiratory disease. Learn how to identify and eliminate mold from your home. Aussi disponible en français sous le titre : Combattre la moisissure -- Guide pour les propriétaires-occupants
62043	CE 9	**Maintaining Your HRV** For a clean and healthy living environment, review the seven steps to maintaining the Heat Recovery Ventilator (HRV). Aussi disponible en français sous le titre : L'entretien du VRC
60339	CE 10	**Wood Heat Safety in an Emergency** Whether you often use a wood stove or a fireplace, or are coping with an emergency loss of electricity, learn how to safely use wood to heat your home. Aussi disponible en français sous le titre : Le chauffage au bois en toute sécurité lors d'une situation d'urgence
60356	CE 11	**When You Must Leave Your House Due to Prolonged Winter Power Outage** A series of practical tips to protect your home in case you are required to evacuate for more than 24 hours because of power failure. Aussi disponible en français sous le titre : Si vous devez quitter votre maison à cause d'une longue interruption de courant en hiver
60360	CE 12	**Helping Your Trees Survive Storm Damage** Practical pruning advice to restore the health and shape of trees damaged by ice or wind storms. Aussi disponible en français sous le titre : Soins à donner aux arbres endommagés par une tempête
62034	CE 13	**Attic Venting, Attic Moisture, and Ice Dams** How do you deal with a leak in the ceiling? How should an attic be properly vented? How do you eliminate ice dams? This fact sheet will answer these and other attic related questions. Aussi disponible en français sous le titre : Ventilation du vide sous toit, humidité dans le vide sous toit et formation de barrières de glace

Order no.	Series no.	Title
62035	CE 14	**Soot Staining on Carpets** Does your carpet have permanent dark stains near baseboards, air registers or under doorways? Find out what causes carpet streaking and what you can do about it. Aussi disponible en français sous le titre : Taches en traînée sur les moquettes
62036	CE 15	**Removing Ice on Roofs** Whether you have a sloped or flat roof, learn techniques that will help you deal with extensive roof icing or ice dam problems. Aussi disponible en français sous le titre : L'enlèvement de la glace sur les toitures
62037	CE 17	**The Importance of Bathroom and Kitchen Fans** Choosing the proper kitchen and bathroom fans is important for improving indoor air quality and maintaining ideal humidity levels. Aussi disponible en français sous le titre : Importance des ventilateurs de cuisine et de salle de bains
62038	CE 18	**How to Read a Material Safety Data Sheet (MSDS)** Reading and understanding the Material Safety Data Sheet (MSDS) provides product information about product hazards and the necessary safety precautions to follow when using it. Aussi disponible en français sous le titre : Comment déchiffrer une fiche technique sur la sécurité des substances (FTSS)
62039	CE 19	**Insulating Your House** Choose the right insulation to reduce the amount of energy you use and to make your home more comfortable. Aussi disponible en français sous le titre : L'isolation de votre maison
62040	CE 21	**Log Homes: Frequently Asked Questions** A list of questions and answers concerning the unique design and building considerations for log homes. Aussi disponible en français sous le titre : Foire aux questions - maisons en rondins
62041	CE 22	**Your Furnace Filter** To reduce exposure to airborne particles, choose the furnace filter that best suits your needs. Aussi disponible en français sous le titre : Le filtre de votre générateur d'air chaud

Order no.	Series no.	Title
62042	CE 23	**Water-Saving Tips for Your Lawn and Garden** Often water is applied inefficiently, resulting in significant waste due to over watering, evaporation or run-off. Here are some general watering tips to avoid such waste. Aussi disponible en français sous le titre : Comment entretenir vos pelouses et jardins en économisant l'eau
60417	CE 24	**Backup Power for Your Home** The top ten tips in choosing the appropriate backup system to provide electricity to your home in the event of a prolonged power failure. Aussi disponible en français sous le titre : Alimentation de secours pour votre maison
62046	CE 25	**Carbon Monoxyde** A list of questions and answers dealing with keeping Carbon Monoxide out of your home and to help you choose the right CO detector. Aussi disponible en français sous le titre : Le monoxyde de carbone
62277	CE 26a	**Hiring a Contractor** How do you find the "right" contractor for you? What should go in a contract? What are liens, holdbacks and completion certificates? Make sure you get what you want and pay for when hiring a contractor. Aussi disponible en français sous le titre : Le Choix d'un entrepreneur
62351	CE 26b	**Sample Renovation Contract** A detailed written contract between you and the contractor you hire is essential to any renovation or home repair project, no matter its size. Aussi disponible en français sous le titre : Modèle de contrat de rénovation
62045	CE 27	**Choosing a Dehumidifier** Air that is too damp can cause condensation on windows, water damage to materials, mold and even wood rot. Choose the right dehumidifier to regulate the humidity in your home. Aussi disponible en français sous le titre : Le Choix d'un déshumidificateur
	CE 28	**The Renovation Project (12 parts)**
		This series will assist you in making informed decisions before you renovate. Each easy-to-read fact sheet helps you ask the key questions, reviews the available options and discusses the consequences if certain aspects of the renovation are overlooked. Advance planning is the key to successful renovations. These fact sheets help you plan, assess, and avoid surprises. Achieve the results you want by doing your renovation right the first time.

Order no.	Series no.	Title
62246	CE 28a	**Assessing the Renovation Project** Before renovating, it's important to assess your home's current condition to determine if there are significant problems that you must deal with before or during the renovation project. Aussi disponible en français sous le titre : Évaluation des travaux de rénovation
62248	CE 28b	**Renovating your Basement - Structural Issues and Soil Conditions** Renovating a basement can add value and extra living space to a home. Fixing foundation problems before renovating is essential to preserve the durability and structure of the house. Aussi disponible en français sous le titre : Rénovation du sous-sol - Aspects structuraux et conditions du sol
62250	CE 28c	**Renovating Your Basement - Moisture Problems** Is there condensation on the basement windows? Are there white chalky stains on the foundation? Do the carpets smell musty? Creating a clean, dry and healthy living space is a critical first step. Aussi disponible en français sous le titre : Avant de rénover votre sous-sol - Problèmes d'humidité
62252	CE 28d	**Renovating Your Kitchen** The kitchen is often the most used room in the house and kitchen renovations typically have the highest financial payback. Conduct a pre-renovation inspection and prioritize the most desirable features for your new kitchen. Aussi disponible en français sous le titre : Avant de rénover votre cuisine
62254	CE 28e	**Renovating Your Bathroom** Bathroom renovations offer the second highest financial payback rate and are one of the most common home improvement projects. Use this fact sheet to check for problems before you renovate. Aussi disponible en français sous le titre : Rénovation de la salle de bains
62256	CE 28f	**Window and Door Renovations** Do you want more natural light in your living area? Are you concerned about security? Before repairing or replacing windows and doors, consider all of the factors outlined in this fact sheet. Aussi disponible en français sous le titre : Nouvelles portes et fenêtres

Order no.	Series no.	Title
62258	CE 28g	**Repairing or Replacing Roof Finishes** Regular maintenance and periodic roof inspections will identify problems before they cause costly damage to your home. Learn about the key factors that will determine whether you should repair or replace your roof. Aussi disponible en français sous le titre : Avant de réparer ou remplacer le revêtement du toit
62260	CE 28h	**Repairing and Replacing Materials - Exterior Walls** Exterior finish materials must prevent rain and snow from penetrating the building and causing moisture damage. Repairing or replacing exterior wall finishes will protect and preserve the durability and structure of the home. Aussi disponible en français sous le titre : Avant de réparer ou remplacer des matériaux - les murs extérieurs
62262	CE 28i	**Energy Efficient Retrofit - Mechanical Systems** Upgrading the heating, cooling and ventilation (HVAC) equipment is the best way to create a healthy, comfortable and less expensive home to operate. Before altering these, it is important to understand how the overall performance of the house will be affected. Aussi disponible en français sous le titre : Avant d'améliorer l'efficacité énergétique de votre maison - installations mécaniques
62264	CE 28j	**Energy Efficient Retrofit - The Building Envelope** The envelope, or outer layer, of your house separates living space from the outdoor elements. Improving it can result in a better insulated, more airtight home that is easier to heat. Aussi disponible en français sous le titre : Améliorer l'efficacité énergétique - L'enveloppe du bâtiment
62266	CE 28k	**Assessing the Comfort and Safety of Mechanical Systems** The heating, ventilating and air conditioning (HVAC) systems are a vital part of your home. Ensure that your mechanical systems are operating safely and efficiently. Aussi disponible en français sous le titre : Évaluation de vos installations mécaniques - confort et sécurité
62268	CE 28L	**A New Addition** Before building an addition, clearly identify the features you need and inspect the current structure and mechanical systems to be sure they can support the new addition. Aussi disponible en français sous le titre : Avant de construire une annexe

Order no.	Series no.	Title
62044	CE 29	**Should you get your Heating Ducts Cleaned?** Should you get your heating ducts cleaned? Will clean ducts result in improved air quality? When is duct cleaning most appropriate? This fact sheet separates fact from fiction. Aussi disponible en français sous le titre : Doit-on faire nettoyer les conduits de chauffage?
63322	CE 30	**Water Damage, Mold and House Insurance** You've had water damage in your house due to a burst pipe, a roof leak, or a heavy summer storm. You hope that your insurance will cover the damage. What to do? Aussi disponible en français sous le titre : Moisissure, dommages causés par l'eau et assurance habitation
62226	CE 31	**Understanding and Dealing with Interactions Between Trees, Sensitive Clay Soils and Foundations** Is the size, type or siting of a tree affecting your foundation? Understanding the interactions between trees, soils and the foundation can help you avoid foundation shifting, cracks and other damage. Aussi disponible en français sous le titre : Comprendre l'interaction des arbres, du sol d'argile sensible et des fondations et agir en conséquence
65329	CE 32	**Setback Thermostats** There are many claims about the energy savings due to setback thermostats. This document quantifies the savings but also describes houses or conditions where setback thermostats are not recommended. Aussi disponible en français sous le titre : Les thermostats programmables
62288	CE 33	**CMHC Garbage Bag Airflow Test** This simple test uses an ordinary garbage bag to help you estimate airflow from your furnace registers, bathroom exhaust fan or clothes dryer exhaust. Aussi disponible en français sous le titre : Essai de mesure du débit d'air à l'aide d'un sac à ordures
62795	CE 34	**Your Septic System** A primer on the components, operation and proper maintenance of an in-ground septic tank and system. Aussi disponible en français sous le titre : Votre installation d'assainissement
62839	CE 35	**Hiring a Home Inspector** One of the best ways to understand about a home's condition, habitability and safety is to hire a professional home inspector. Aussi disponible en français sous le titre : Le Choix d'un inspecteur en bâtiment

Order no.	Series no.	Title
62341	CE 36	**The Condominium Owners' Guide to Mold** Special advice for identifying and removing mold in a condo, and solving the problems that cause it. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des copropriétaires
63902	CE 37	**The Tenant's Guide to Mold** This guide provides tenants of apartment buildings or rental houses with information to understand why mold grows and what they can do if they find mold growing in their unit. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des locataires
64066	CE 38	**How to Reduce Chemical Contaminants in Your Home** This guide focuses on reducing exposure to chemical contaminants in the home, and will help you identify and avoid household products and materials which are sources of chemical contaminants. Aussi disponible en français sous le titre : Réduire les contaminants chimiques dans votre maison
62935	CE 39	**Buying a Toilet** Advice and tips on what to look for when buying a toilet. Aussi disponible en français sous le titre : L'achat de toilettes
63319	CE 40	**Buying a House with a Well and Septic System** Information on what to inspect and test if a property has a well and/or septic system. Includes checklists for potential buyers. Aussi disponible en français sous le titre : L'achat d'une maison avec un puits et une installation septique
62953	CE 41A	**UV Water Treatment** Describes the ultra-violet light water treatment process, and the pros and cons of using such a system. Aussi disponible en français sous le titre : Traitement de l'eau aux rayons ultraviolets (UV)
62898	CE 41B	**Water Distillers** Everything you ever wanted to know about water distillers from how they work to how to install and maintain them. Aussi disponible en français sous le titre : La distillation de l'eau

Order no.	Series no.	Title
62896	CE41C	**Water Filters** Consumer series of household water treatment options. Water filters are an inexpensive method of additional water treatment. Some filters can remove certain contaminants such as lead. Aussi disponible en français sous le titre : Filtres à eau
62946	CE 41D	**Water Softeners** Find out how a water softener works and obtain information on whether you should consider installing one. Aussi disponible en français sous le titre : Les adoucisseurs d'eau
62962	CE 41E	**Reverse Osmosis Water Treatment** Describes the reverse osmosis water treatment process, and provides the pros and cons of using such a system. Aussi disponible en français sous le titre : Filtration de l'eau par osmose inverse
62966	CE 42	**Canada's Construction System** The purpose of this document is to foster understanding of the elements of the system of construction and operation of buildings and houses in Canada. Aussi disponible en français sous le titre : Système de construction canadien
63890	CE 43	**Photovoltaics (PVs)** Consumer information piece presenting information on solar electric (photovoltaic) systems for housing Aussi disponible en français sous le titre : Les systèmes photovoltaïques
63134	CE 44	**Painting: Walls, Ceilings and Floors** This fact sheet provides general information on: selecting paints, e.g. latex (water based) or alkyd (oil based); types of paint and paint finishes, e.g. low or high sheen, sealer, primer, melamine; estimating quantity of paint required; preparing for painting; and painting tips. Aussi disponible en français sous le titre : La peinture : murs, plafonds et planchers.
63144	CE 45	**Flooring Choices** A quick summary of the advantages, considerations, installation, maintenance, and costs to think about when choosing resilient, laminate, and wood flooring, as well as carpet and ceramic tile. Aussi disponible en français sous le titre : Les revêtements de sol

Order no.	Series no.	Title
63349	CE 46	**Fighting Asthma in Your House** Practical tips to help people with asthma improve the indoor air quality of their home. Aussi disponible en français sous le titre : Combattre l'asthme à la maison
63218	CE47	**Home Maintenance Schedule** This fact sheet provides a listing of the regular home maintenance tasks which should be done at various times throughout the year to protect the condition of your house. Aussi disponible en français sous le titre : Calendrier d'entretien de votre maison
63227	CE48	**Replacing Your Furnace** This fact sheet provides information for consumers who are replacing their existing furnace with a new one. It deals with fuel choice, furnace selection, and furnace sizing. Aussi disponible en français sous le titre : Le remplacement d'un générateur de chaleur
63235	CE 49	**Getting Your House Ready to Sell** Tips for homeowners who wish to get their house ready to sell. Aussi disponible en français sous le titre : Ce qu'il faut faire avant de mettre votre maison en vente
63436	CE50	**Avoiding Basement Flooding** Basement flooding leads to damage of the finishing material and possible growth of mold. This document reviews why basements flood and how to prevent floods from occurring. Aussi disponible en français sous le titre : Comment prévenir les inondations de sous-sol
63486	CE51	**Get to Know Your Soil** This fact sheet provides practical tips on how to analyse soil so that you can select the plants that are suited to the soil you have on your property. Once you have determined the soil conditions, it provides tips on how to amend it, if needed. Aussi disponible en français sous le titre : Apprenez à connaître votre sol
63488	CE52	**Low-Maintenance Lawns** Low-maintenance lawns help to reduce the time, costs, water, pesticides, fertilizer and energy used to maintain lawns. This fact sheet describes the benefits and provides practical tips on how to install and maintain low maintenance lawns, including species selection. Aussi disponible en français sous le titre : Les pelouses à faible entretien

Order no.	Series no.	Title
63490	CE53	**Rain Gardens: Improve Stormwater Management in Your Yard** Rain gardens are landscaped areas designed to receive stormwater and allow it to infiltrate into the soil. This fact sheet describes the benefits and provides practical tips on how to install and maintain gardens. Aussi disponible en français sous le titre : Un jardin pluvial pour mieux gérer les eaux de ruissellement dans votre cour
63492	CE54	**Understanding Your New Home Sales Contract** This fact sheet provides information on some of the terms and provisions that you may find in a new home sales agreement to illustrate what a contract can cover and an explanation why. Aussi disponible en français sous le titre : Comprendre le contrat de vente de votre maison neuve
63495	CE55	**Selecting A New Home Builder** This fact sheet provides information on how to find and what to look for and consider when searching for the right builder to build your new home. Aussi disponible en français sous le titre : Le choix d'un constructeur d'habitations
63637	CE56	**Preventing Falls on Stairs** This fact sheet tells you about some of the ways you can reduce the risk of falling on or from residential stairs. Aussi disponible en français sous le titre : Comment prévenir les chutes dans les escaliers
63730	CE57	**Efficient, Convenient Wood Heating** This is a short guide to the proper use of woodburning appliances in homes: what appliances to choose, how to operate them efficiently, what wood to burn, how to cut and store it, etc. Aussi disponible en français sous le titre : Le chauffage au bois pratique et efficace
63683	CE58	**The ABC's of Windows** This document will help consumers understand and select window performance levels with respect to airtightness, rain penetration and wind resistance appropriate for their climatic (and geographical) location and exposure conditions. Aussi disponible en français sous le titre : L'ABC des fenêtres

Order no.	Series no.	Title
63911	CE59	**Should You Test the Air in Your Home for Mold?** Testing the air in their home or apartment for mold is usually the first thing many people ask for when they suspect the presence of mold or have discovered mold growth. This fact sheet explains why air testing is not recommended, why an investigation by a trained professional is more useful and what to do if testing is deemed necessary. Aussi disponible en français sous le titre : Faut-il faire analyser l'air de la maison pour déceler la présence de moisissures?
63822	CE60	**What to Do After a Fire** Protect your health and prevent further damage to your home by following this detailed guide on the steps to restore your home after a fire. Aussi disponible en français sous le titre : Que faire après un incendie
64092	CE61	**Renovating Your Basement for Livability** This About Your House describes how renovating a full-height basement can be a relatively easy and cost-effective way to add new living space to your house. Aussi disponible en français sous le titre : Rénovation du sous-sol - objectif d'habitabilité
64064	CE62	**Lead in Older Homes** This About Your House describes where lead is found in older homes and who is at risk to lead exposure. It also describes procedures for testing lead in soil, water, paint, and dust. Aussi disponible en français sous le titre : Le plomb dans les vieilles maisons
65023	CE63a	**Accessible Housing by Design - Ramps (Large Print)** For anyone who needs to make their house accessible to someone who uses a wheelchair or other mobility device, this About Your House sheds light on the design and construction of ramps for the home. After reading this publication, you will understand how a ramp should be built, the materials that should be used and things to take into consideration before building a ramp for your home. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - Les rampes d'accès (à gros caractères)

Order no.	Series no.	Title
65080	CE63b	**Accessible Housing by Design - Appliances (Large Print)** The design of an appliance can make it very easy or very difficult to use. If you have a disability, limitations in an appliance's design can make it almost impossible to use. Using the principles of Universal Design, this About Your House will help you select an appliance by outlining important design considerations, making helpful suggestions and explaining the safety features of appliances. Aussi disponible en français sous le titre : Une habitation accessible dès la conception — les appareils (à gros caractères)
65542	CE63c	**Accessible Housing by Design - Lifts & Residential Elevators** Residential lifts and elevators can benefit many people— particularly seniors who want to remain in their homes despite a loss of mobility, strength or agility. This About Your House tells you about the types of residential lifts and elevators that are commonly available in Canada. It also tells you about some of the things you should consider when you choose and install an elevator or lift in your home. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - élévateurs et ascenseurs résidentiels
65544	CE63d	**Accessible Housing by Design - Residential Hoists and Ceiling Lifts** A residential hoist or ceiling lift can help people who have difficulty safely moving themselves or others in or out of bed, or in or out of a bathtub. This About Your House tells you about the types of residential hoists and ceiling lifts that are commonly available in Canada. It also tells you about some of the issues you should consider when you choose and install a hoist or ceiling lift in a house, condominium or apartment. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - les lève-personnes résidentiels
65588	CE63e	**Accessible Housing by Design - Kitchens** A home designed and constructed to reflect the principles of Universal Design is safer and more accommodating to the diverse range of ages and abilities of people who live in and visit this home. This About Your House discusses the Universal Design kitchen, which considers efficient design, efficiency of effort, adaptability, ease of cleaning, audibility and safety in order to provide a comfortable and safe space for all family members. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - les cuisines

Order no.	Series no.	Title
65686	CE63f	**Accessible Housing by Design: Bathrooms** A bathroom designed and constructed according to the principles of universal design should be comfortable and safe for all family members, regardless of age or ability. This About Your House outlines the design considerations and elements of a universally designed bathroom, from manoeuvring space and ease of cleaning to grab bars and walk-in bathtubs and showers. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - salle de bains
65889	CE63g	**Accessible Housing by Design: Home Automation** The use of technology and automation in the home can help create living spaces that are convenient and energy efficient, that minimize the potential for accidents, and result in a house that is able to adapt to life's changes. Home automation provides many benefits to people with physical, sensory and mental disabilities, allowing them to live more independently. This AYH describes systems and devices that can control elements of your home environment . lighting, appliances, telephones, home security and mechanical, entry and safety systems . resulting in an environment that is more accommodating to everyone who lives there or visits, regardless of age or physical ability. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - Domotique
65009	CE65	**Garden Suites** With municipal approval, a garden suite is a self-contained unit, set on relative's property with an existing single family house. This publication provides introductory information on garden suites for seniors or persons with disabilities. Aussi disponible en français sous le titre : Les pavillons-jardins
65527	CE66A	**How to Lock Out Crime - Home Security 101** This fact sheet walks you through an assesment of your home's current security; includes a checklist that can help you assess what needs to be improved. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile 101
65529	CE66B	**How to Lock Out Crime - Home Security - Exterior** This fact sheet gives you suggestions on how to improve security from the exterior of your home through lighting strategies and home visibility. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - L'extérieur

Order no.	Series no.	Title
65531	CE66C	**How to Lock Out Crime - Home Security—Alarms** This fact sheet gives you information to help you decide whether an installed burglar alarm is the right choice for you. Two types of systems are discussed, the perimeter alarm system and the area alarm system. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les avertisseurs
65533	CE66D	**How to Lock Out Crime - Home Security - Doors** This fact sheet suggests ways you can improve your door security. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les portes
65535	CE66E	**How to Lock Out Crime - Home Security - Windows** This fact sheet suggests ways to improve the security performance of your windows. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les fenêtres
65537	CE66F	**How to Lock Out Crime - Home Security - Patio Doors** This fact sheet suggests ways to improve the security of one of the favourite targets of burglars: patio doors. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les portes-fenêtres
65539	CE66G	**How to Lock Out Crime: Home Security -- Common Sense** Even if all the required bolts, hinges, latches and alarms have been installed, good home security cannot be achieved without first adopting the common-sense precautions outlined in this fact sheet. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Une affaire de bon sens
65548	CE70	**EQuilibrium: Healthy Housing for a Healthy Environment** CMHC's EQuilibrium housing initiative is a powerful new movement in sustainable housing. It can help homeowners reduce their energy bills, protect their families' health, reduce greenhouse gas emissions, and keep the environment clean for generations to come. Aussi disponible en français sous le titre : Equilibrium : maison saine pour un environnement sain

Order no.	Series no.	Title
63419	AE1	**Solving Odour Transfer Problems in Your Apartment** One of the most common problems experienced by the occupants of apartment buildings is the transfer of objectionable odours from one apartment to another. Tobacco smoke and cooking odours top the list of complaints. This fact sheet explains how odours are transferred, and offers a number of potential solutions. Some are very easy to implement and others should be done with the agreement of the building management. Some are trial and error. Solving the problem can take perseverance. Aussi disponible en français sous le titre : Enrayez la transmission d'odeurs dans votre appartement
63904	AE2	**Reducing Noise in Your Apartment** This article provides basic information about the behaviour of sound and noise and suggests ways to improve the peace and tranquility in your apartment or condominium. Aussi disponible en français sous le titre : Atténuation du bruit dans votre appartement
65013	AE3	**Dealing with Power Outages** Lengthy power outages rarely occur in Canada, but when they do, they can affect your comfort and safety. This fact sheet, intended specifically for occupants of multi-unit residential buildings, will help you plan ahead for, and deal with, power outages in your apartment building. Topics include, amongst others, contents of an emergency kit, use of alternate power, and summer and winter power failures. Aussi disponible en français sous le titre : Les pannes de courant
65050	AE4	**Fire Safety** Each year, many Canadians are injured or die in house or apartment fires. This fact sheet, intended specifically for occupants of multi-unit residential buildings, offers practical fire prevention tips and important information regarding smoke alarms. It will also help you create an escape plan for you and your family, and instruct you on what to do should a fire occur in your apartment. Aussi disponible en français sous le titre : La sécurité-incendie
65041	AE5	**Improving Your Security and Safety** This About Your Apartment fact sheet, intended specifically for occupants of multi-unit residential buildings, provides practical advice on how to protect yourself, your family, and your belongings. It highlights the types of security and safety features you may have in your building and how to use them effectively. Topics include, amongst others, proper locks for windows and doors, neighbourhood security, preventing falls from windows and balconies, combustion safety, and carbon monoxide. Aussi disponible en français sous le titre : Pour une meilleure sécurité chez soi

Order no.	Series no.	Title
65297	AE6	**Dealing with Pests** Most people can relate to the surprise, shock and revulsion of coming across pests in their homes. This fact sheet, intended specifically for occupants of multi-unit residential buildings, will help you prevent and reduce infestations in your apartment by describing how insects enter homes and what they need to survive. Topics include pest proofing your apartment, Integrated Pest Management (IPM), and health concerns associated with pests and pesticides. Aussi disponible en français sous le titre : La lutte contre les parasites
66002	AE7	**The Tenant's Guide to Mold** This fact sheet is intended for people living in rented apartments and offers practical information on mold problems beginning with an overview of mold and its causes, why it is a concern, and how to identify a mold problem and estimate its severity. Since it was written with renters in mind, this guide discusses tenants' versus landlord's responsibilities when a mold problem is discovered, and whether you should call on professional help or insist that your landlord do so. Other topics addressed include cleaning up mold, preventing mold, mold-proofing different rooms and selecting an apartment that is not moldy. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des locataires

ABOUT YOUR HOUSE - **NORTH SERIES**

VOTRE MAISON - **DOSSIER DU NORD**

The North About Your House series is a series specifically designed around day to day northern solutions as well as innovative northern models of building practices which work under cold climate conditions. In this series you will find examples of how to use structural panels in the high arctic, means to cleanse waste-water in the North as well as demonstrated ways of constructing a roof which can withstand northern conditions and how to choose a foundation system which will work in any of the northern communities.

Order no.	Series no.	Title
62303	North Series 1	Building with Structural Panels -- Repulse Bay
62304	Dossier du Nord	Maison à panneaux isolants de construction à Repulse Bay
62295	North Series 2	On-site Wastewater Reclamation Systems for the North
62297	Dossier du Nord 2	Installations de recyclage sur place des eaux usées dans le nord
62329	North Series 3	Snowshoe Inn, Fort Providence Co-generation Model
62330	Dossier du Nord 3	Modèle de cogénération du Snowshoe Inn, Fort Providence
62298	North Series 4	Residential Foundation Systems for Permafrost Regions
62299	Dossier du Nord 4	Fondations pour les bâtiments résidentiels construits sur le pergélisol
62154	North Series 5	Eagle Lake Healthy House
62155	Dossier du Nord 5	La maison saine d'Eagle Lake
62313	North Series 6	Arctic Hot Roof Design
62314	Dossier du Nord 6	Conception de toits chauds pour climat arctique
63050	North Series 8	How to Prevent Plumbing and Heating Vent Stack Freeze-up
63051	Dossier du Nord 8	Prévenir le gel des colonnes de ventilation de plomberie et des conduits d'évacuation de l'appareil de chauffage
63394	North Series 9	Fancoil Integrated Combination Heat and Domestic Hot Water Systems
63395	Séries du Nord 9	Installation de chauffage des locaux et de l'eau intégrée à un ventilo-convecteur

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66060	08-104	Approaching Net-Zero Energy in Existing Housing
65961	08-103	Laboratory Depressurization Test for Residential Gas Appliances - Part 2
65916	08-102	Development and Assessment of Crawl Space Remediation Strategies
65830	08-101	Benchmarking Home Energy Savings from Energy-Efficient Lighting
65903	08-100	Assessment of Natural Ventilation for Canadian Residential Buildings
65861	07-124	Residential Solar Mass Wall Analysis for Canada
65843	07-123	Understanding Vapour Permeance and Condensation in Wall Assemblies
65828	07-122	Straw Bale Construction in Atlantic Canada
65834	07-120	The Effects of Programmable Fan Conrollers on Ventilation, Air Distribution and Energy Use
65863	07-119	Monitored Thermal Performance of ICF Walls in MURBs
65891	07-118	Preserved Wood as a Potential Source of Arsenic and Fungi in the Foundation Walls of Homes
65684	07-117	Investigation of the Performance of Residential Electronic Filters in Actual Use
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65649	07-115	Whistle Bend Planning and Design Charrette
65546	07-114	Wind-Rain Relationships in Southwestern British Columbia
65322	07-113	Sustainable Northern Development Charrette in Yellowknife
65302	07-112	Research on Green Rooftops and Walls in Québec City
65417	07-111	Field Testing of Valved Soffit Vent Performance in Protecting Roof and Attic in Strong Winds
65378	07-110	Action Plan for Sustainable Practices - Implementation Strategies for the Residential and Business Sections in the Greater Toronto Area

Order no.	Series no.	TITLE
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65352	07-108	Boiler Piping Study
65350	07-107	Southeast False Creek Integrated Design Process Workshops
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65033	07-105	Performance Evaluation of Retrofitted Solid Masonry Exterior Walls
65421	07-104	High-Performance Stucco for Housing
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65295	07-102	The Effects of Reflective Interior Shades on Cooling Energy Consumption at the CCHT Research Facility
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65344	07-100	Relationship Between Moisture Content and Mechanical Properties of Gypsum Sheathing
65104	06-114	Old North End, Saint John, New Brunswick Community Planning and Housing Charrette
65187	06-113	Green Roofs: A Resource Manual for Municipal Policy Makers
65100	06-112	Arviat Community and Housing Design Charrette
65259	06-111	Validation of an Onsite Wastewater Risk Assessment Model
65257	06-110	Impact of Water Softeners on Septic Tanks - Field Evaluation Study
65092	06-109	Occupancy-based Classification System for Design and Construction of Residential Basements
65243	06-108	Field Assessment of a NuAir AIMS eKOCOMFORT™ Unit
65245	06-107	The eKOCOMFORT Field Assessment Program
65274	06-106	West Coast Green Roof Performance at BCIT's Green Roof Research Facility
65035	06-104	Household Environmental Monitoring - A Strategy to Help Homeowners Reduce Their Environmental Impact
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Order no.	Series no.	TITLE
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64942	05-120	Investigating Moisture in Seasonal Housing
64940	05-119	Energy and Water Consumption Load Profiles in Multi-Unit Residential Buildings
64911	05-117	Predicting Time to Fogging of Insulated Glass Units
64913	05-116	Nunavut Research 2003-2005
64908	05-115	Study of Poured-in Place Concrete Wall Assemblies in Coastal British Columbia
64855	05-114	Reduction of Airborne Particles in Houses with Occupants Having Respiratory Ailments
64904	05-113	Duct Leakage Tests in Small Diameter Ducting System
64853	05-112	Assessment of Suite Compartmentalization and Depressurization in New High-rise Residential Buildings
64806	05-111	Laboratory Depressurization Test for Residential Gas Appliances
64843	05-110	Remote Monitoring and Control of On-site Wastewater Treatment, Recycling, and Reuse Systems
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63669	05-106	"The Land We Live on is our Home" The 'Gameti Ko' Project Second Community-led Workshop
63876	05-105	Testing the Adhesion of Air- Barrier Membranes in Wall Assemblies
63848	05-104	Ice Damming Field Research
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63838	05-102	Development of Micro-CHP Technology Assessment Capability at CCHT
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63816	05-100	Effects of Thermostat Setting on Energy Consumption
63745	04-131	Water Reuse Standards and Verification Protocol

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63726	04-126	Update of Roof Truss Designs with Nailing Schedules
63641	04-125	Residential Sources of Lead
63677	04-124	Summary of Research on Water Resistive Barriers
63675	04-123	Assessing the Impact of Thickness on the Performance of Stucco Cladding
63673	04-122	Comparison and Analysis of Provincial Builder and Renovator Industry Programs
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63465	04-119	Diagnosing Attic Performance by Snow- and Frost-Melt Patterns
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63612	04-116	Energy Needs and Availability in Housing
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63542	04-108	Garage Performance Testing
63503	04-107	Survey of In-Suite Space and Domestic Hot Water Heating Systems In Multi-Residential Buildings
63400	04-105	Field Testing of an Integrated Ventilation Space Conditioning System for Apartments

Order no.	Series no.	TITLE
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63376	04-100	Improved Make-up Air Supply Techniques
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63328	03-127	Static and Dynamic Earthquake Testing of Rainscreen Stucco Systems for B.C. Residential Wood-Frame Construction
63339	03-125	Water Penetration Resistance of Windows - Study of Codes, Standards, Testing and Certification
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63172	03-101	Mandatory Home Inspections on Resale Homes in Ontario
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